DEX-0142

EL

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : C12P 21/04, C12N 15/00, C07H 21/02	A1	(11) International Publication Number: WO 00/55351 (43) International Publication Date: 21 September 2000 (21.09.00)

(21) International Application Number: PCT/US00/05883

(22) International Filing Date: 8 March 2000 (08.03.00)

(30) Priority Data:
60/124,270 12 March 1999 (12.03.99) US

(71) Applicant (*for all designated States except US*): HUMAN GENOME SCIENCES, INC. [US/US]; 9410 Key West Avenue, Rockville, MD 20850 (US).

(72) Inventors; and
(75) Inventors/Applicants (*for US only*): ROSEN, Craig, A. [US/US]; 22400 Rolling Hill Road, Laytonsville, MD 20882 (US). RUBEN, Steven, M. [US/US]; 18528 Heritage Hills Drive, Laytonsville, MD 20882 (US).

(74) Agents: WALES, Michele, M. et al.; Human Genome Sciences, Inc., 9410 Key West Avenue, Rockville, MD 20850 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: HUMAN COLON CANCER ASSOCIATED GENE SEQUENCES AND POLYPEPTIDES

(57) Abstract

This invention relates to newly identified colon or colon cancer related polynucleotides and the polypeptides encoded by these polynucleotides herein collectively known as "colon cancer antigens", and to the complete gene sequences associated therewith and to the expression products thereof, as well as the use of such colon cancer antigens for detection, prevention and treatment of disorders of the colon, particularly the presence of colon cancer. This invention relates to the colon cancer antigens as well as vectors, host cells, antibodies directed to colon cancer antigens and recombinant and synthetic methods for producing the same. Also provided are diagnostic methods for diagnosing and treating, preventing and/or prognosing disorders related to the colon, including colon cancer, and therapeutic methods for treating such disorders. The invention further relates to screening methods for identifying agonists and antagonists of colon cancer antigens of the invention. The present invention further relates to methods and/or compositions for inhibiting the production and/or function of the polypeptides of the present invention.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania
AM	Armenia
AT	Austria
AU	Australia
AZ	Azerbaijan
BA	Bosnia and Herzegovina
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
BY	Belarus
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CN	China
CU	Cuba
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GE	Georgia
GH	Ghana
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IL	Israel
IS	Iceland
IT	Italy
JP	Japan
KE	Kenya
KG	Kyrgyzstan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakstan
LC	Saint Lucia
LI	Liechtenstein
LK	Sri Lanka
LR	Liberia
LS	Lesotho
LT	Lithuania
LU	Luxembourg
LV	Latvia
MC	Monaco
MD	Republic of Moldova
MG	Madagascar
MK	The former Yugoslav Republic of Macedonia
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
MX	Mexico
NE	Niger
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SG	Singapore
SI	Slovenia
SK	Slovakia
SN	Senegal
SZ	Swaziland
TD	Chad
TG	Togo
TJ	Tajikistan
TM	Turkmenistan
TR	Turkey
TT	Trinidad and Tobago
UA	Ukraine
UG	Uganda
US	United States of America
UZ	Uzbekistan
VN	Viet Nam
YU	Yugoslavia
ZW	Zimbabwe

Human Colon Cancer Associated Gene Sequences and Polypeptides

Field of the Invention

This invention relates to newly identified colon or colon cancer related polynucleotides and the polypeptides encoded by these polynucleotides herein collectively known as "colon cancer antigens," and to the complete gene sequences associated therewith and to the expression products thereof, as well as the use of such colon cancer antigens for detection, prevention and treatment of disorders of the colon, particularly the presence of colon cancer. This invention relates to the colon cancer antigens as well as vectors, host cells, antibodies directed to colon cancer antigens and recombinant and synthetic methods for producing the same. Also provided are diagnostic methods for diagnosing and treating, preventing and/or prognosing disorders related to the colon, including colon cancer, and therapeutic methods for treating such disorders. The invention further relates to screening methods for identifying agonists and antagonists of colon cancer antigens of the invention. The present invention further relates to methods and/or compositions for inhibiting the production and/or function of the polypeptides of the present invention.

Background of the Invention

Colorectal cancers are among the most common cancers in men and women in the U.S. and are one of the leading causes of death. Other than surgical resection no other systemic or adjuvant therapy is available. Vogelstein and colleagues have described the sequence of genetic events that appear to be associated with the multistep process of colon cancer development in humans (Trends Genet 9(4):138-41 (1993)). An understanding of the molecular genetics of carcinogenesis, however, has not led to preventative or therapeutic measures. It can be expected that advances in molecular genetics will lead to better risk assessment and early diagnosis but colorectal cancers will remain a deadly disease for a majority of patients due to the

lack of an adjuvant therapy. Adjuvant or systemic treatments are likely to arise from a better understanding of the autocrine factors responsible for the continued proliferation of cancer cells.

Colorectal carcinoma is a malignant neoplastic disease. There is a high incidence of colorectal carcinoma in the Western world, particularly in the United States. Tumors of this type often metastasize through lymphatic and vascular channels. Many patients with colorectal carcinoma eventually die from this disease. In fact, it is estimated that 62,000 persons in the United States alone die of colorectal carcinoma annually.

At the present time the only systemic treatment available for colon cancer is chemotherapy. However, chemotherapy has not proven to be very effective for the treatment of colon cancers for several reasons, the most important of which is the fact that colon cancers express high levels of the MDR gene (that codes for multi-drug resistance gene products). The MDR gene products actively transport the toxic substances out of the cell before the chemotherapeutic agents can damage the DNA machinery of the cell. These toxic substances harm the normal cell populations more than they harm the colon cancer cells for the above reasons.

There is no effective systemic treatment for treating colon cancers other than surgically removing the cancers. In the case of several other cancers, including breast cancers, the knowledge of growth promoting factors (such as EGF, estradiol, IGF-11) that appear to be expressed or effect the growth of the cancer cells, has been translated for treatment purposes. But in the case of colon cancers this knowledge has not been applied and therefore the treatment outcome for colon cancers remains bleak.

There is a need, therefore, for identification and characterization of such factors that modulate activation and differentiation of colon cells, both normally and in disease states. In particular, there is a need to isolate and characterize additional molecules that mediate apoptosis, DNA repair, tumor-mediated angiogenesis, genetic imprinting, immune responses to tumors and tumor antigens and, among other things, that can play a role in detecting, preventing, ameliorating or correcting dysfunctions or diseases of the colon.

Summary of the Invention

The present invention includes isolated nucleic acid molecules comprising, or alternatively, consisting of, a colon and/or colon cancer associated polynucleotide sequence disclosed in the sequence listing (as SEQ ID Nos:1 to 773) and/or contained in a human cDNA clone described in Tables 1, 2 and 5 and deposited with the American Type Culture Collection ("ATCC"). Fragments, variant, and derivatives of these nucleic acid molecules are also encompassed by the invention. The present invention also includes isolated nucleic acid molecules comprising, or alternatively consisting of, a polynucleotide encoding a colon or colon cancer polypeptide. The present invention further includes colon and/or colon cancer polypeptides encoded by these polynucleotides. Further provided for are amino acid sequences comprising, or alternatively consisting of, colon and/or colon cancer polypeptides as disclosed in the sequence listing (as SEQ ID Nos: 774 to 1546) and/or encoded by a human cDNA clone described in Tables 1, 2 and 5 and deposited with the ATCC. Antibodies that bind these polypeptides are also encompassed by the invention. Polypeptide fragments, variants, and derivatives of these amino acid sequences are also encompassed by the invention, as are polynucleotides encoding these polypeptides and antibodies that bind these polypeptides. Also provided are diagnostic methods for diagnosing and treating, preventing, and/or prognosing disorders related to the colon, including colon cancer, and therapeutic methods for treating such disorders. The invention further relates to screening methods for identifying agonists and antagonists of colon cancer antigens of the invention.

Detailed Description

Tables

Table 1 summarizes some of the colon cancer antigens encompassed by the invention (including contig sequences (SEQ ID NO:X) and the cDNA clone related to the contig sequence) and further summarizes certain characteristics of the colon cancer polynucleotides and the polypeptides encoded thereby. The first column shows the "SEQ ID NO:" for each of the 773 colon cancer antigen polynucleotide sequences of the invention. The second column provides a unique "Sequence/Contig ID"

identification for each colon and/or colon cancer associated sequence. The third column, "Gene Name," and the fourth column, "Overlap," provide a putative identification of the gene based on the sequence similarity of its translation product to an amino acid sequence found in a publicly accessible gene database and the database accession no. for the database sequence having similarity, respectively. The fifth and sixth columns provide the location (nucleotide position nos. within the contig), "Start" and "End", in the polynucleotide sequence "SEQ ID NO:X" that delineate the preferred ORF shown in the sequence listing as SEQ ID NO:Y. The seventh and eighth columns provide the "% Identity" (percent identity) and "% Similarity" (percent similarity), respectively, observed between the aligned sequence segments of the translation product of SEQ ID NO:X and the database sequence. The ninth column provides a unique "Clone ID" for a cDNA clone related to each contig sequence.

Table 2 summarizes ATCC Deposits, Deposit dates, and ATCC designation numbers of deposits made with the ATCC in connection with the present application.

Table 3 indicates public ESTs, of which at least one, two, three, four, five, ten, fifteen or more of any one or more of these public EST sequences are optionally excluded from certain embodiments of the invention.

Table 4 lists residues comprising antigenic epitopes of antigenic epitope-bearing fragments present in most of the colon or colon cancer associated polynucleotides described in Table 1 as predicted by the inventors using the algorithm of Jameson and Wolf, (1988) Comp. Appl. Biosci. 4:181-186. The Jameson-Wolf antigenic analysis was performed using the computer program PROTEAN (Version 3.11 for the Power MacIntosh, DNASTAR, Inc., 1228 South Park Street Madison, WI). Colon and colon cancer associated polypeptides shown in Table 1 may possess one or more antigenic epitopes comprising residues described in Table 4. It will be appreciated that depending on the analytical criteria used to predict antigenic determinants, the exact address of the determinant may vary slightly. The residues and locations shown in Table 4 correspond to the amino acid sequences for most colon and colon cancer associated polypeptide sequence shown in the Sequence Listing.

Table 5 shows the cDNA libraries sequenced, and ATCC designation numbers and vector information relating to these cDNA libraries.

Definitions

The following definitions are provided to facilitate understanding of certain terms used throughout this specification.

In the present invention, "isolated" refers to material removed from its original environment (e.g., the natural environment if it is naturally occurring), and thus is altered "by the hand of man" from its natural state. For example, an isolated polynucleotide could be part of a vector or a composition of matter, or could be contained within a cell, and still be "isolated" because that vector, composition of matter, or particular cell is not the original environment of the polynucleotide. The term "isolated" does not refer to genomic or cDNA libraries, whole cell total or mRNA preparations, genomic DNA preparations (including those separated by electrophoresis and transferred onto blots), sheared whole cell genomic DNA preparations or other compositions where the art demonstrates no distinguishing features of the polynucleotide/sequences of the present invention.

As used herein, a "polynucleotide" refers to a molecule having a nucleic acid sequence contained in SEQ ID NO:X (as described in column 1 of Table 1) or the related cDNA clone (as described in column 9 of Table 1 and contained within a library deposited with the ATCC). For example, the polynucleotide can contain the nucleotide sequence of the full length cDNA sequence, including the 5' and 3' untranslated sequences, the coding region, as well as fragments, epitopes, domains, and variants of the nucleic acid sequence. Moreover, as used herein, a "polypeptide" refers to a molecule having an amino acid sequence encoded by a polynucleotide of the invention as broadly defined (obviously excluding poly-Phenylalanine or poly-Lysine peptide sequences which result from translation of a polyA tail of a sequence corresponding to a cDNA).

In the present invention, "SEQ ID NO:X" was often generated by overlapping sequences contained in multiple clones (contig analysis). A representative clone containing all or most of the sequence for SEQ ID NO:X is deposited at Human Genome Sciences, Inc. (HGS) in a catalogued and archived library. As shown in column 9 of Table 1, each clone is identified by a cDNA Clone ID. Each Clone ID is unique to an individual clone and the Clone ID is all the information needed to

retrieve a given clone from the HGS library. In addition to the individual cDNA clone deposits, most of the cDNA libraries from which the clones were derived were deposited at the American Type Culture Collection (hereinafter "ATCC"). Table 5 provides a list of the deposited cDNA libraries. One can use the Clone ID to determine the library source by reference to Tables 2 and 5. Table 5 lists the deposited cDNA libraries by name and links each library to an ATCC Deposit. Library names contain four characters, for example, "HTWE." The name of a cDNA clone ("Clone ID") isolated from that library begins with the same four characters, for example "HTWEP07". As mentioned below, Table 1 correlates the Clone ID names with SEQ ID NOs. Thus, starting with a SEQ ID NO, one can use Tables 1, 2 and 5 to determine the corresponding Clone ID, from which library it came and in which ATCC deposit the library is contained. Furthermore, it is possible to retrieve a given cDNA clone from the source library by techniques known in the art and described elsewhere herein. The ATCC is located at 10801 University Boulevard, Manassas, Virginia 20110-2209, USA. The ATCC deposits were made persuant to the terms of the Budapest Treaty on the international recognition of the deposit of microorganisms for the purposes of patent procedure.

A "polynucleotide" of the present invention also includes those polynucleotides capable of hybridizing, under stringent hybridization conditions, to sequences contained in SEQ ID NO:X, or the complement thereof (e.g., the complement of any one, two, three, four, or more of the polynucleotide fragments described herein), and/or sequences contained in the related cDNA clone within a library deposited with the ATCC. "Stringent hybridization conditions" refers to an overnight incubation at 42 degree C in a solution comprising 50% formamide, 5x SSC (750 mM NaCl, 75 mM trisodium citrate), 50 mM sodium phosphate (pH 7.6), 5x Denhardt's solution, 10% dextran sulfate, and 20 μg/ml denatured, sheared salmon sperm DNA, followed by washing the filters in 0.1x SSC at about 65 degree C.

Also included within "polynucleotides" of the present invention are nucleic acid molecules that hybridize to the polynucleotides of the present invention at lower stringency hybridization conditions. Changes in the stringency of hybridization and signal detection are primarily accomplished through the manipulation of formamide concentration (lower percentages of formamide result in lowered stringency); salt

conditions, or temperature. For example, lower stringency conditions include an overnight incubation at 37 degree C in a solution comprising 6X SSPE (20X SSPE = 3M NaCl; 0.2M NaH_2PO_4; 0.02M EDTA, pH 7.4), 0.5% SDS, 30% formamide, 100 ug/ml salmon sperm blocking DNA; followed by washes at 50 degree C with 1XSSPE, 0.1% SDS. In addition, to achieve even lower stringency, washes performed following stringent hybridization can be done at higher salt concentrations (e.g. 5X SSC).

Note that variations in the above conditions may be accomplished through the inclusion and/or substitution of alternate blocking reagents used to suppress background in hybridization experiments. Typical blocking reagents include Denhardt's reagent, BLOTTO, heparin, denatured salmon sperm DNA, and commercially available proprietary formulations. The inclusion of specific blocking reagents may require modification of the hybridization conditions described above, due to problems with compatibility.

Of course, a polynucleotide which hybridizes only to polyA+ sequences (such as any 3' terminal polyA+ tract of a cDNA shown in the sequence listing), or to a complementary stretch of T (or U) residues, would not be included in the definition of "polynucleotide," since such a polynucleotide would hybridize to any nucleic acid molecule containing a poly (A) stretch or the complement thereof (e.g., practically any double-stranded cDNA clone generated using oligo dT as a primer).

The polynucleotides of the present invention can be composed of any polyribonucleotide or polydeoxribonucleotide, which may be unmodified RNA or DNA or modified RNA or DNA. For example, polynucleotides can be composed of single- and double-stranded DNA, DNA that is a mixture of single- and double-stranded regions, single- and double-stranded RNA, and RNA that is mixture of single- and double-stranded regions, hybrid molecules comprising DNA and RNA that may be single-stranded or, more typically, double-stranded or a mixture of single- and double-stranded regions. In addition, the polynucleotide can be composed of triple-stranded regions comprising RNA or DNA or both RNA and DNA. A polynucleotide may also contain one or more modified bases or DNA or RNA backbones modified for stability or for other reasons. "Modified" bases include, for example, tritylated bases and unusual bases such as inosine. A variety of

modifications can be made to DNA and RNA; thus, "polynucleotide" embraces chemically, enzymatically, or metabolically modified forms.

In specific embodiments, the polynucleotides of the invention are at least 15, at least 30, at least 50, at least 100, at least 125, at least 500, or at least 1000 continuous nucleotides but are less than or equal to 300 kb, 200 kb, 100 kb, 50 kb, 15 kb, 10 kb, 7.5kb, 5 kb, 2.5 kb, 2.0 kb, or 1 kb, in length. In a further embodiment, polynucleotides of the invention comprise a portion of the coding sequences, as disclosed herein, but do not comprise all or a portion of any intron. In another embodiment, the polynucleotides comprising coding sequences do not contain coding sequences of a genomic flanking gene (i.e., 5' or 3' to the gene of interest in the genome). In other embodiments, the polynucleotides of the invention do not contain the coding sequence of more than 1000, 500, 250, 100, 50, 25, 20, 15, 10, 5, 4, 3, 2, or 1 genomic flanking gene(s).

"SEQ ID NO:X" refers to a colon cancer antigen polynucleotide sequence described in Table 1. SEQ ID NO:X is identified by an integer specified in column 1 of Table 1. The polypeptide sequence SEQ ID NO:Y is a translated open reading frame (ORF) encoded by polynucleotide SEQ ID NO:X. There are 773 colon cancer antigen polynucleotide sequences described in Table 1 and shown in the sequence listing (SEQ ID NO:1 through SEQ ID NO:773). Likewise there are 773 polypeptide sequences shown in the sequence listing, one polypeptide sequence for each of the polynucleotide sequences (SEQ ID NO:774 through SEQ ID NO:1546). The polynucleotide sequences are shown in the sequence listing immediately followed by all of the polypeptide sequences. Thus, a polypeptide sequence corresponding to polynucleotide sequence SEQ ID NO:1 is the first polypeptide sequence shown in the sequence listing. The second polypeptide sequence corresponds to the polynucleotide sequence shown as SEQ ID NO:2, and so on. In otherwords, since there are 773 polynucleotide sequences, for any polynucleotide sequence SEQ ID NO:X, a corresponding polypeptide SEQ ID NO:Y can be determined by the formula X + 773 = Y. In addition, any of the unique "Sequence/Contig ID" defined in column two of Table 1, can be linked to the corresponding polypeptide SEQ ID NO:Y by reference to Table 4.

The polypeptides of the present invention can be composed of amino acids joined to each other by peptide bonds or modified peptide bonds, i.e., peptide isosteres. and may contain amino acids other than the 20 gene-encoded amino acids. The polypeptides may be modified by either natural processes, such as posttranslational processing, or by chemical modification techniques which are well known in the art. Such modifications are well described in basic texts and in more detailed monographs, as well as in a voluminous research literature. Modifications can occur anywhere in a polypeptide, including the peptide backbone, the amino acid side-chains and the amino or carboxyl termini. It will be appreciated that the same type of modification may be present in the same or varying degrees at several sites in a given polypeptide. Also, a given polypeptide may contain many types of modifications. Polypeptides may be branched. for example, as a result of ubiquitination, and they may be cyclic, with or without branching. Cyclic, branched, and branched cyclic polypeptides may result from posttranslation natural processes or may be made by synthetic methods. Modifications include acetylation, acylation, ADP-ribosylation, amidation, covalent attachment of flavin, covalent attachment of a heme moiety, covalent attachment of a nucleotide or nucleotide derivative, covalent attachment of a lipid or lipid derivative, covalent attachment of phosphotidylinositol, cross-linking, cyclization, disulfide bond formation, demethylation, formation of covalent cross-links, formation of cysteine, formation of pyroglutamate, formylation, gamma-carboxylation, glycosylation, GPI anchor formation, hydroxylation, iodination. methylation, myristoylation, oxidation, pegylation, proteolytic processing, phosphorylation, prenylation, racemization, selenoylation, sulfation, transfer-RNA mediated addition of amino acids to proteins such as arginylation, and ubiquitination. (See, for instance, PROTEINS - STRUCTURE AND MOLECULAR PROPERTIES, 2nd Ed., T. E. Creighton, W. H. Freeman and Company, New York (1993); POSTTRANSLATIONAL COVALENT MODIFICATION OF PROTEINS, B. C. Johnson, Ed., Academic Press, New York, pgs. 1-12 (1983); Seifter et al., Meth Enzymol 182:626-646 (1990); Rattan et al., Ann NY Acad Sci 663:48-62 (1992).)

The colon and colon cancer polypeptides of the invention can be prepared in any suitable manner. Such polypeptides include isolated naturally occurring polypeptides, recombinantly produced polypeptides, synthetically produced

polypeptides, or polypeptides produced by a combination of these methods. Means for preparing such polypeptides are well understood in the art.

The polypeptides may be in the form of the secreted protein, including the mature form, or may be a part of a larger protein, such as a fusion protein (see below). It is often advantageous to include an additional amino acid sequence which contains secretory or leader sequences, pro-sequences, sequences which aid in purification, such as multiple histidine residues, or an additional sequence for stability during recombinant production.

The colon and colon cancer polypeptides of the present invention are preferably provided in an isolated form, and preferably are substantially purified. A recombinantly produced version of a polypeptide, including the secreted polypeptide, can be substantially purified using techniques described herein or otherwise known in the art, such as, for example, by the one-step method described in Smith and Johnson, Gene 67:31-40 (1988). Polypeptides of the invention also can be purified from natural, synthetic or recombinant sources using techniques described herein or otherwise known in the art, such as, for example, antibodies of the invention raised against the polypeptides of the present invention in methods which are well known in the art.

By a polypeptide demonstrating a "functional activity" is meant, a polypeptide capable of displaying one or more known functional activities associated with a full-length (complete) protein of the invention. Such functional activities include, but are not limited to, biological activity, antigenicity [ability to bind (or compete with a polypeptide for binding) to an anti-polypeptide antibody], immunogenicity (ability to generate antibody which binds to a specific polypeptide of the invention), ability to form multimers with polypeptides of the invention, and ability to bind to a receptor or ligand for a polypeptide.

"A polypeptide having functional activity" refers to polypeptides exhibiting activity similar, but not necessarily identical to, an activity of a polypeptide of the present invention, including mature forms, as measured in a particular assay, such as, for example, a biological assay, with or without dose dependency. In the case where dose dependency does exist, it need not be identical to that of the polypeptide, but rather substantially similar to the dose-dependence in a given activity as compared to

the polypeptide of the present invention (i.e., the candidate polypeptide will exhibit greater activity or not more than about 25-fold less and, preferably, not more than about tenfold less activity, and most preferably, not more than about three-fold less activity relative to the polypeptide of the present invention).

The functional activity of the colon cancer antigen polypeptides, and fragments. variants derivatives. and analogs thereof, can be assayed by various methods.

For example. in one embodiment where one is assaying for the ability to bind or compete with full-length polypeptide of the present invention for binding to an antibody to the full length polypeptide antibody, various immunoassays known in the art can be used, including but not limited to, competitive and non-competitive assay systems using techniques such as radioimmunoassays, ELISA (enzyme linked immunosorbent assay), "sandwich" immunoassays, immunoradiometric assays, gel diffusion precipitation reactions, immunodiffusion assays, in situ immunoassays (using colloidal gold, enzyme or radioisotope labels, for example), western blots, precipitation reactions, agglutination assays (e.g., gel agglutination assays, hemagglutination assays), complement fixation assays, immunofluorescence assays, protein A assays, and immunoelectrophoresis assays, etc. In one embodiment, antibody binding is detected by detecting a label on the primary antibody. In another embodiment. the primary antibody is detected by detecting binding of a secondary antibody or reagent to the primary antibody. In a further embodiment, the secondary antibody is labeled. Many means are known in the art for detecting binding in an immunoassay and are within the scope of the present invention.

In another embodiment, where a ligand is identified, or the ability of a polypeptide fragment, variant or derivative of the invention to multimerize is being evaluated, binding can be assayed, e.g., by means well-known in the art, such as, for example, reducing and non-reducing gel chromatography, protein affinity chromatography, and affinity blotting. See generally, Phizicky, E., et al., Microbiol. Rev. 59:94-123 (1995). In another embodiment, physiological correlates polypeptide of the present invention binding to its substrates (signal transduction) can be assayed.

In addition, assays described herein (see Examples) and otherwise known in the art may routinely be applied to measure the ability of polypeptides of the present

invention and fragments, variants derivatives and analogs thereof to elicit polypeptide related biological activity (either in vitro or in vivo). Other methods will be known to the skilled artisan and are within the scope of the invention.

Colon and Colon Cancer Associated Polynucleotides and Polypeptides of the Invention

It has been discovered herein that the polynucleotides described in Table 1 are expressed at significantly enhanced levels in human colon and/or colon cancer tissues. Accordingly, such polynucleotides, polypeptides encoded by such polynucleotides, and antibodies specific for such polypeptides find use in the prediction, diagnosis, prevention and treatment of colon related disorders, including colon cancer as more fully described below.

Table 1 summarizes some of the polynucleotides encompassed by the invention (including contig sequences (SEQ ID NO:X) and the related cDNA clones) and further summarizes certain characteristics of these colon and/or colon cancer associated polynucleotides and the polypeptides encoded thereby.

Table 1

Seq ID No.	Sequence/ Contig ID	Gene Name	Overlap	HGS Nucleotide Start	HGS Nucleotide End	% Identity	% Similarity	Clone ID
1	500802			2	304			HGBAI83
2	531091			2	292			HUKDY21
3	553147	Immunoglobulin kappa light chain variable region L25 [Homo sapiens] >pir|S41816|S41816 Ig kappa chain V region L25 - human Length = 119	gi|415381	3	440	73	86	HCASG85
4	558860	(AB008790) Grb7V protein [Homo sapiens] >sp|D1030000|D1030000 GRB7V PROTEIN. >gi|1526535 Grb7 protein [Homo sapiens] {SUB 130-343} Length = 447	gnl|PID|d1030000	33	635	97	98	HCEGY28
5	561730	(AF039700) antigen NY-CO-38 [Homo sapiens] >sp|G3170200|G3170200 ANTIGEN NY-CO-38. >gi|3170198 (AF039699) antigen NY-CO-37 [Homo sapiens] {SUB 1-403} Length = 652	gi|3170200	34	393	98	98	HSDFA48
6	585938	MDA-7 [Homo sapiens] >sp|Q13007|MDA7_HUMAN MDA-7 PROTEIN PRECURSOR (MELANOMA DIFFERENTIATION ASSOCIATED PROTEIN 7). Length = 206	gi|1141751	206	538	81	81	HMQBR31
7	587785	disintegrin-protease [Homo sapiens] >sp|O15204|O15204 DISINTEGRIN-PROTEASE. Length = 470	gnl|PID|e332729	2	331	100	100	HOSBO86

8	588916	Human apoC-II gene for preproapolipoprotein C-II [Homo sapiens] >gi|757915 apoCII protein [Homo sapiens] >gi|178836 apolipoprotein C-II [Homo sapiens] >pir|A24238|LPHUC2 apolipoprotein C-II precursor - human	gi|296636	5	376	100	100	HLDQU56
9	613825			3	260			HMSHB03
10	639090			254	559			HCRME22
11	651644			63	194			HCFBO73
12	659544			109	249			HJMBU15
13	659739	KHS1 [Homo sapiens] >sp|G1857331|G1857331 KHS1. Length = 846	gi|1857331	238	1140	94	94	HSYAM68
14	661057	protein kinase Dyrk2 [Homo sapiens] >sp|Q92630|Q92630 PROTEIN KINASE DYRK2 (PROTEIN KINASE. DYRK2). >gnl|PID|e280618 Dyrk2 [Homo sapiens] {SUB 320-528} Length = 528	gnl|PID|e321513	3	425	100	100	HCDBX83
15	661313			894	1118			HHEMN11
16	666316			193	369			HCDCH84
17	669229			430	762			HOHDD51
18	670471	(AJ003061) most expressed alternative spliced form [Homo sapiens] >sp|O60852|O60852 PROTEIN ENCODED BY SACCHAROMYCES CEREVISIAE SPC98 HOMOLOGUE. Length = 907	gnl|PID|e1293754	203	937	92	93	HAGGX21
19	676611			207	530			HCE5C73
20	691240			2	385			HISAN54

21	702977	26-kDa cell surface protein TAPA-1 [Homo sapiens] >pir|A35649|A35649 cell surface protein TAPA-1 - human >sp|P18582|CD81_HUMAN CD81 ANTIGEN (26 KD CELL SURFACE PROTEIN TAPA-1). Length = 236	gi|338678	34	819	80	80	HGCMV09
22	709517			344	478			HWLJX38
23	714730	(AF062476) retinoic acid-responsive protein; STRA6 [Mus musculus] >sp|O70491|O70491 RETINOIC ACID-RESPONSIVE PROTEIN. Length = 670	gi|3126975	1	534	75	88	HCRND05
24	714834			1	657			HAPTL75
25	715016			1	411			HCEOQ15
26	719584	(AF076856) small espin [Rattus norvegicus] >sp|G3818569|G3818569 SMALL ESPIN. Length = 253	gi|3818569	530	886	62	64	HWLFA47
27	724637	muskelin [Mus musculus] >sp|O89050|O89050 MUSKELIN. Length = 735	gi|3493462	1	444	92	95	HUSXP30
28	728392	(AB015318) gamma2-adaptin [Homo sapiens] >sp|O75843|O75843 GAMMA2-ADAPTIN. Length = 785	gnl|PID|d1034356	160	801	100	100	HBJIG25
29	738716			137	289			HCRMQ71
30	739056	similar to ADP-ribosylation factor;	gnl|PID|e1350748	2	502	87	97	HSDZB27
31	739143	(AF054179) H beta 58 homolog [Homo sapiens] >sp|O75436|O75436 H BETA 58 HOMOLOG. Length = 327	gi|3342000	1	1083	100	100	HKABV36
32	742329			2	277			HSRDE23
33	742557			2	814			HWHGD94
34	745481			1229	1396			HPMFL67
35	746035			414	959			HCHCJ20
36	753731			1	357			HPTTL69

37	754383			3	434			HBGMG69
38	756749			3	464			HMEJZ19
39	757980			365	622			HETIS94
40	764818			3	1700			HCE4A59
41	765140			3	200			HRODG74
42	766893			178	414			HCEOS64
43	771338	(AF034745) LNXp80 [Mus musculus] >sp|O70263|O70263 LIGAND OF NUMB-PROTEIN X (LNXP80). Length = 728	gi|3041879	1	681	91	96	HCQDR53
44	771412			2	601			HCHAG61
45	772226	(AF011794) cell cycle progression restoration 8 protein [Homo sapiens] >sp|O14712|O14712 CELL CYCLE PROGRESSION RESTORATION 8 PROTEIN. Length = 375	gi|2352906	3	257	100	100	HMVCR68
46	773057			36	236			HE2BE05
47	773173			514	693			HTEPE82
48	780154			44	820			HCEZW82
49	780768			1176	1352			HPLBS64
50	780779	similar to G9a gene. [Homo sapiens] >sp|Q15047|Q15047 MRNA (KIAA0067) FOR ORF (RELATED TO G9A GENE), COMPLETE CDS (KIAA0067). Length = 1291	gnl|PID|d1007261	134	658	86	86	HAMFL51
51	782394			1068	1337			HDLBC18
52	783160	(AF026977) microsomal glutathione S-transferase 3 [Homo sapiens] >sp|O14880|O14880 MICROSOMAL GLUTATHIONE S-TRANSFERASE 3. Length = 152	gi|2583081	25	492	100	100	HE9PG68
53	783506			49	825			HODCW56

54	784446			19	282			HBJFL85
55	784832			134	751			HCGMI84
56	786813			114	347			HE2O155
57	792139	(AB002086) p47 [Rattus norvegicus] >gnl|PID|e294068 XY40 protein [Rattus norvegicus] >sp|O35987|O35987 P47, COMPLETE CDS. Length = 370	gnl|PID|d1022509	32	334	83	85	H6EEC65
58	793987			100	564			HCIAE18
59	805715			513	1226			HDPKI64
60	811111			1	438			HCEDF72
61	811113	steroidogenic acute regulatory protein [Mus musculus] >pir|A55455|A55455 steroidogenic acute regulatory protein precursor, mitochondrial - mouse Length = 284	gi|1236243	2	718	28	50	HWBEX78
62	823902	(AF028722) fetal globin inducing factor [Mus musculus] >sp|G4103857|G4103857 FETAL GLOBIN INDUCING FACTOR. Length = 238	gi|4103857	36	497	87	94	HDTBD43
63	826518	RNase 4 [Homo sapiens] >pir|I52489|I52489 ribonuclease 4 (EC 3.1.-.-) precursor - human Length = 147	gnl|PID|d1007727	1	231	100	100	HLQCQ62
64	826704			475	726			HCQBI18
65	827720			789	1076			HFICY86
66	828102			106	297			HSRFC02
67	828180	(AB013456) aquaporin 8 [Homo sapiens] >gnl|PID|d1035202 (AB013456) aquaporin 8 [Homo sapiens] >sp|D1035202|D1035202 AQUAPORIN 8. Length = 261	gnl|PID|d1035202	20	883	83	83	HWLFM26

68	828386	(AF093821) RRM RNA binding protein GRY-RBP [Mus musculus] >sp|O88991|O88991 RRM RNA BINDING PROTEIN GRY-RBP. Length = 625	gi|3694986	3	650	100	100	HOHAD26
69	828658	protein-tyrosine-phosphatase [Homo sapiens] >gnl|PID|d1032930 (AB013601) DUSP6 [Homo sapiens] >gnl|PID|d1035350 (AB013382) DUSP6 [Homo sapiens] >gnl|PID|d1032930 (AB013601) DUSP6 [Homo sapiens] >sp|Q16828|DUS6_HUMAN DUAL SPECIFICITY PROTEIN PHOSPHATASE 6	gnl|PID|e218263	2	568	100	100	HLHCO24
70	828919	RNA helicase [Homo sapiens] >pir|S71758|S71758 DEAD box protein MrDb, Myc-regulated - human >sp|Q92732|Q92732 RNA HELICASE. Length = 610	gnl|PID|e254454	2	661	99	100	HFOYL30
71	829572			163	411			HSVAK51
72	830138	similar to Glyoxalase [Caenorhabditis elegans] Length = 281	gnl|PID|e1344082	134	475	53	67	HYAAH90
73	830208	UbcH5B [Homo sapiens] >gi|595668 ubiquitin conjugating enzyme [Rattus norvegicus] >gi|1480742 ubiquitin conjugating enzyme [Mus musculus] >pir|S53359|S53359 ubiquitin conjugating enzyme (E217kB) - rat Length = 147	gi|1145689	2	205	92	95	HIBCN46
74	830248	A33 antigen precursor [Homo sapiens] >sp|Q99795|A33_HUMAN CELL SURFACE A33 ANTIGEN	gi|1814277	3	1097	30	39	HWLHJ13

		PRECURSOR. Length = 319						
75	830275	Similar to D.melanogaster parallel sister chromatids protein [Homo sapiens] >sp|Q92549|Q92549 MYELOBLAST KIAA0261 (FRAGMENT). Length = 1287	gnl|PID|d1014081	3	647	100	100	HWLFO28
76	830286	interferon-related putative protein [Homo sapiens] >sp|Q12894|Q12894 HYPOTHETICAL 48.0 KD PROTEIN. >gi|1209022 interferon-related putative protein [Homo sapiens] {SUB 2-442} Length = 442	gi|2880033	385	1488	91	91	HWLFE46
77	830347	(AF039401) calcium-dependent chloride channel-1 [Homo sapiens] >sp|G4009460|G4009460 CALCIUM-DEPENDENT CHLORIDE CHANNEL-1. Length = 914	gi|4009460	3	656	63	76	HWLEL81
78	830348			3	911			HWHQR45
79	830364	inorganic pyrophosphatase (EC 3.6.1.1) - bovine >sp|P37980|IPYR_BOVIN INORGANIC PYROPHOSPHATASE (EC 3.6.1.1) (PYROPHOSPHATE PHOSPHO- HYDROLASE) (PPASE). Length = 289	pir|A45153|A45153	3	1022	67	85	HWLEI47
80	830394			1	951			HDPVF62
81	830398			526	627			HWBCR84

82	830412	SDF2 [Homo sapiens] >pir|JC5106|JC5106 stromal cell-derived factor 2 - human >sp|Q99470|Q99470 SDF2. Length = 211	gnl|PID|d1009953	233	928	91	92	HWHHQ57
83	830436	(AJ005821) X-like 1 protein [Homo sapiens] >sp|E1291794|E1291794 X-LIKE 1 PROTEIN. Length = 3027	gnl|PID|e1291794	83	523	65	78	HWABR83
84	830464	CLP36 [Rattus norvegicus] >pir|JC4385|JC4385 LIM protein - rat >sp|P52944|CL36_RAT LIM PROTEIN CLP36. Length = 327	gi|1020151	2	289	72	81	HUSGB72
85	830471			95	229			HUSIK51
86	830477	(AF011794) cell cycle progression restoration 8 protein [Homo sapiens] >sp|O14712|O14712 CELL CYCLE PROGRESSION RESTORATION 8 PROTEIN. Length = 375	gi|2352906	116	2389	95	96	HULAT84
87	830500	ORF YGR036c [Saccharomyces cerevisiae] >pir|S64327|S64327 probable membrane protein YGR036c - yeast (Saccharomyces cerevisiae) Length = 239	gnl|PID|e243385	185	736	38	54	HJPCP29
88	830509	(AL021813) phenylalanyl-trna synthetase alpha chain [Schizosaccharomyces pombe] >sp|O42849|O42849 PHENYLALANYL-TRNA SYNTHETASE ALPHA CHAIN. Length = 589	gnl|PID|e1250585	2	1081	40	63	HUFAU68

89	830528	hepatoma-derived growth factor [Mus musculus] >pir|JC5662|JC5662 hepatoma-derived growth factor-related protein 2 - mouse >sp|O35540|O35540 HEPATOMA-DERIVED GROWTH FACTOR, RELATED PROTEIN 2. Length = 669	dbj||D63850_1	38	1591	78	87	HUFBF32
90	830542	mitochondrial 3-oxoacyl-CoA thiolase [Homo sapiens] >pir|S43440|S43440 3-oxoacyl-CoA thiolase - human Length = 397	gnl|PID|d1004316	324	1637	92	92	HTTDO45
91	830564			702	1343			HTPBU79
92	830611	IgM heavy chain VH1 region precursor [Homo sapiens] Length = 146	gi|2344934	1	495	78	79	HTJMB28
93	830618			655	915			HDTMI21
94	830620			452	754			HTGDM95
95	830630	mitochondrial benzodiazepine receptor [Homo sapiens] >pir|I38724|I38724 mitochondrial benzodiazepine receptor - human >gi|3411163 (AF075589) peripheral-type benzodiazepine receptor [Homo sapiens] {SUB 27-169} Length = 169	gi|529946	14	259	100	100	HTGFS43
96	830654	RNA-binding protein [Saccharomyces cerevisiae] Length = 497	gi|295631	2	1687	40	51	HSYBQ96
97	830660			122	694			HSYDW13
98	830661			555	779			HSXDG80
99	830704	pp21 [Homo sapiens] >pir|I53785|I53785 gene pp21 protein - human >sp|Q15170|Q15170 (PP21). Length = 157	gi|521207	1	609	51	76	HSUSF13
100	830765			39	236			HSKES11

101	830778	methionine aminopeptidase [Homo sapiens] >gi|687243 eIF-2-associated p67 homolog [Homo sapiens] >pir|S52112|DPHUM2 methionyl aminopeptidase (EC 3.4.11.18) 2 - human >sp|P50579|AMP2_HUMAN METHIONINE AMINOPEPTIDASE 2 (EC 3.4.11.18) (METAP 2) (PEPTIDASE M 2)	gi|903982	26	718	99	100	HSPAX18
102	830784			595	858			HSIFY77
103	830800	(AF039918) CD39L4 [Homo sapiens] >sp|O75356|O75356 CD39L4. Length = 428	gi|3335102	1	990	94	94	HHPDD94
104	830821			449	754			HAQND53
105	830849			464	868			HHEAA48
106	830903			1	525			HPJCT75
107	830913	tumor necrosis factor type I receptor associated protein [Homo sapiens] >pir|A55877|A55877 tumor necrosis factor type I receptor associated protein TRAP-1 - human	gi|687237	3	1193	99	99	HPIBH48
108	830920	microsomal glutathione S-transferase 2 [Homo sapiens] >sp|Q99735|GST2_HUMAN MICROSOMAL GLUTATHIONE S-TRANSFERASE II (EC 2.5.1.18) (MICROSOMAL GST- II). Length = 147	gi|1747521	90	650	87	87	HPHAA84
109	830938	peroxisome proliferator activated receptor gamma 2 [Homo sapiens] >gi|1711117 ligand activated transcription factor PPARgamma2 [Homo sapiens]	gi|1432177	227	610	98	98	HONAE45

110	830980	beta COP [Rattus norvegicus] >pir|S13520|S13520 beta-COP protein - rat >sp|P23514|COPB_RAT COATOMER BETA SUBUNIT (BETA-COAT PROTEIN) (BETA-COP). >pir|S13636|S13636 110K protein - rabbit {SUB 451-500} Length = 953	gi|55819	47	289	95	98	HCESG53
111	831014	(AF016687) similar to alpha-actinin [Caenorhabditis elegans] >sp|O16785|O16785 T21D12.4 PROTEIN. Length = 375	gi|2315828	310	1188	53	73	HOEBV08
112	831026			340	687			HOBAE30
113	831031			526	765			HTXOK56
114	831055	(AF091395) Trio isoform [Homo sapiens] >sp|O75962|O75962 TRIO ISOFORM. Length = 3038	gi|3644048	674	1921	93	94	HNTAT24
115	831057			3	1106			HNTCW73
116	831062			3	821			HNTBD04
117	831117			400	579			HMWBR70
118	831122	cell surface glycoprotein [Homo sapiens] >gi|567110 [Human CD79b/Ig beta/B29 gene, complete coding sequence.], gene product [Homo sapiens] >bbs|122035 membrane immunoglobulin beta chain, Ig-beta=Ag receptor complex [human, B cells, Peptide, 229 aa] [Homo	gi|179312	2	772	91	92	HMWCV70
119	831125			868	1023			HMWFH12
120	831132			36	185			HMUAR55

121	831152	(AC004668) similar to murine cell cycle regulator MIDA1; similar to A57591 (PID:g2137417) [Homo sapiens] >sp|O60414|O60414 WUGSC:H_RG276O03.1A PROTEIN (FRAGMENT). Length = 635	gi|3115346	111	875	90	91	HMVAI57
122	831157	(AF030109) regulator of G protein signaling 12 [Homo sapiens] >gi|2766633 (AF030152) regulator of G protein signaling 12 [Homo sapiens] Length = 799	gi|2605780	664	1110	100	100	HMVAA24
123	831160	ezrin (AA 1-586) [Homo sapiens] >pir|A34400|A34400 ezrin - human >sp|P15311|EZRI_HUMAN EZRIN (P81) (CYTOVILLIN) (VILLIN-2). {SUB 2-586} >gi|340217 cytovillin 2 [Homo sapiens] {SUB 12-586} Length = 586	gi|31283	3	1907	100	100	HCRPE60
124	831193			256	378			HMIAG77
125	831197			884	1267			HMELQ02
126	831217			152	427			HTAAN07
127	831239			420	638			HAKBB67
128	831248			84	443			HCFLL08
129	831313	c-fos protein [Homo sapiens] >gi|29904 c-fos gene product [Homo sapiens] >gi|4063509 (AF111167) cfos [Homo sapiens] >pir|A01342|TVHUF1 transforming protein fos - human >sp|P01100|FOS_HUMAN P55-C-FOS PROTO-ONCOGENE PROTEIN (G0S7 PROTEIN). >sp|G4063509|G406	gi|182735	1182	1670	83	88	HAGDZ30
130	831369			31	1464			HDFQB94

131	831371			81	344			HLADA28
132	831373	cytochrome P450j [Homo sapiens] >gi|181356 cytochrome P450IIE1 [Homo sapiens] >pir|A31949|A31949 cytochrome P450 2E1 - human >sp|P05181|CPE1_HUMAN CYTOCHROME P450 2E1 (EC 1.14.14.1) (CYPIIE1) (P450-J). >gnl|PID|d1001366 cytochrome P450IIE1 [Homo sapiens]	gi|181360	221	1744	94	94	HWADP47
133	831387	hydroxymethylglutaryl-CoA synthase [Homo sapiens] >gi|2463646 3-hydroxy-3-methylglutaryl CoA synthase [Homo sapiens] >pir|S71623|S71623 hydroxymethylglutaryl-CoA synthase (EC 4.1.3.5) precursor, mitochondrial - human >sp|P54868|HMCM_HUMAN HYDROXYMETHYLGLU	gi|619877	717	1586	100	100	HWLLY45
134	831410	mucin 2 precursor, intestinal - human (fragments) >gi|186396 mucin [Homo sapiens] {SUB 626-1895} >gi|186398 MUC2 [Homo sapiens] {SUB 2037-3020} >gi|188874 intestinal mucin [Homo sapiens] {SUB 1916-2193} >gi|188615 mucin-like protein [Homo sapiens] {SUB 23	pir|A49963|A43932	2	727	95	96	HCQDM23
135	831448	calcium-modulated protein S100-beta [artificial sequence] >pir|A91254|BCBOIB S-100 protein beta chain - bovine {SUB 2-92} Length = 92	gi|554574	126	482	32	60	HKACO81
136	831450			807	1319			HKABK55

137	831472			1	138			HJMBH59
138	831473	(AF020043) chromosome-associated polypeptide [Homo sapiens] >sp|O60464|O60464 CHROMOSOME-ASSOCIATED POLYPEPTIDE (BAMACAN PROTEIN). >gnl|PID|e1285055 (AJ005015) bamacan protein [Homo sapiens] {SUB 827-1217} Length = 1217	gi|3089368	40	3765	89	89	HKACE68
139	831474			1231	1746			HWHPX60
140	831494			2	616			HISES08
141	831506	excision repair protein [Homo sapiens] >gi|182174 excision repair protein [Homo sapiens] >gi|2583146 (AF001925) excision repair protein [Homo sapiens] >pir|A32875|A24781 excision repair protein - human >sp|P07992|ERC1_HUMAN DNA EXCISION REPAIR PROTEIN ERC	gi|182177	3	596	100	100	HICAF79
142	831533	similar to yeast adenylate cyclase (S56776) [Homo sapiens] >sp|Q92627|Q92627 MYELOBLAST KIAA0231 (FRAGMENT). Length = 476	gnl|PID|d1013909	1	900	51	69	HCRPH87
143	831539	growth and transformation dependent protein [Rattus norvegicus] >pir|A26882|A26882 pII.2 hypothetical protein - rat (fragment) >sp|Q63571|Q63571 RAT GROWTH AND TRANSFORMATION-DEPENDENT (FRAGMENT). Length = 175	gi|207250	102	572	81	97	HDTIT02
144	831556			395	625			HDTLJ87

145	831594			117	677			HHECU01
146	831598	protein serine/threonine kinase [Homo sapiens] >gi|468789 CDK activating kinase [Homo sapiens] >gi|485909 MO15/CDK-activating kinase (CAK) [Homo sapiens] >gnl|PID|e257806 Cdk-activating kinase [Homo sapiens] >pir|A54820|A54820 CDK-activating protein kinas	gi|348243	23	802	99	99	HHEDO14
147	831608	translational initiation factor beta subunit [Homo sapiens] >pir|A31226|A31226 translation initiation factor eIF-2 beta chain - human >pir|S13147|S13147 protein synthesis factor - rabbit >sp|P20042|IF2B_HUMAN EUKARYOTIC TRANSLATION INITIATION FACTOR 2 BET	gi|182067	120	1154	87	87	HHEFB46
148	831613	Human giant larvae homologue [Homo sapiens] >pir|S55474|S55474 Human giant larvae homolog - human >sp|Q14521|Q14521 GIANT LARVAE HOMOLOGUE. Length = 1015	gi|854124	3	104	96	100	HISAU33
149	831622	alpha 1-acid glycoprotein [Homo sapiens] >gi|1340138 alpha 1-acid glycoprotein [Homo sapiens] {SUB 39-86} Length = 201	gnl|PID|e222211	46	690	99	99	HGBHZ56

150	831631	aldose reductase-like peptide [Homo sapiens] >sp|O60218|O60218 ALDOSE REDUCTASE-LIKE PEPTIDE (ALDOSE REDUCTASE-RELATED PROTEIN). >gi|3098514 (AF044961) aldose reductase-related protein [Homo sapiens] {SUB 232-316} Length = 316	gi|3150035	100	1173	100	100	HGBAX75
151	831632			2	226			HGBCC19
152	831653	lambda-crystallin precursor [Oryctolagus cuniculus] >pir|A31992|A31992 lambda-crystallin - rabbit >sp|P14755|CRYL_RABIT LAMBDA-CRYSTALLIN. {SUB 2-320} Length = 320	gi|164905	172	927	85	90	HTJNI73
153	831655	weak similarity to TPR domains [Caenorhabditis elegans] >sp|Q23049|Q23049 SIMILARITY TO TPR DOMAINS. Length = 458	gi|1465826	3	662	32	54	HFVHF47
154	831708	vascular endothelial growth factor [Homo sapiens] >sp|Q16889|Q16889 VASCULAR ENDOTHELIAL GROWTH FACTOR (FRAGMENT). >pir|A41551|A41551 vascular endothelial growth factor 206 precursor - human {SUB 23-254} >bbs|85194 vascular endothelial growth factor; VEGF	gi|3712671	96	410	98	100	HFIUT25
155	831738			313	573			HFCAI79

156	831741	myelodysplasia/myeloid leukemia factor 2 [Homo sapiens] >gi|3387897 (AF070539) myelodysplasia/myeloid leukemia factor 2 [Homo sapiens] >sp|Q15773|Q15773 MYELODYSPLASIA/MYELOID LEUKEMIA FACTOR 2. Length = 248	gi|1399745	186	974	77	77	HFEBT03
157	831754	multidrug resistance protein 3 [Homo sapiens] >gnl|PID|e1288198 multidrug resistance protein 3 [Homo sapiens] >sp|O60922|O60922 MULTIDRUG RESISTANCE PROTEIN 3. Length = 1526	gnl|PID|e1288198	1	924	92	92	HWMEZ67
158	831760			373	510			HETEH76
159	831780			2	1003			HELGH58
160	831796			892	1158			HE9RY54
161	831800	nuclear protein SA-2 [Homo sapiens] >sp|O00540|O00540 NUCLEAR PROTEIN SA-2. Length = 1162	gnl|PID|e250094	600	1541	93	93	HFIAU59
162	831807			1015	1341			HE9QD17
163	831812			520	765			HE9OY91
164	831813			83	793			HEAHA84
165	831830	isoleucyl-tRNA synthetase [Homo sapiens] >pir|I59314|I59314 isoleucine--tRNA ligase (EC 6.1.1.5) - human Length = 1266	gnl|PID|d1006382	52	2307	98	99	HE8TV13
166	831860	Similarity to S. Pombe BEM1/BUD5 suppressor;	gnl|PID|e1347870	465	776	69	84	HE8OT93
167	831872			1	1671			HE8CL14
168	831896			1	2121			HDTDX05

169	831928	(AF061795) dynamin-like protein Dymple isoform [Homo sapiens] >sp|O60709|O60709 DYNAMIN-LIKE PROTEIN DYMPLE ISOFORM. Length = 699	gi|3126874	2	778	77	77	HSYBO86
170	831949			3	1109			HE8TX12
171	831950			48	521			HAPQS51
172	831953	carbonic anhydrase II [Homo sapiens] >gi|179780 carbonic anhydrase II [Homo sapiens] >gi|179795 carbonic anhydrase II [Homo sapiens] >gi|29587 carbonic anhydrase II (AA 1-260) [Homo sapiens]	gi|179772	106	987	100	100	HWLHA60
173	831975			555	761			HDTBO06
174	832036	human phosphotyrosine phosphatase kappa [Homo sapiens] Length = 1439	gnl|PID|e234080	2	490	82	82	HCYAC13
175	832047			877	1137			HCWKS85
176	832078			751	1014			HA5AB14
177	832100			687	917			HCRNM09
178	832104			95	220			HCRMU71
179	832268			18	191			HTXOU56
180	832270	Ca2+ ATPase of fast-twitch skeletal muscle sacroplasmic reticulum, adult isoform [Homo sapiens] >sp|O14983|O14983 CA2+ ATPASE OF FAST-TWITCH SKELETAL MUSCLE SACROPLASMIC RETICULUM, ADULT ISOFORM. Length = 1001	gi|2052522	622	1290	90	91	HBKDW03

181	832279	acetyl-CoA synthetase [Drosophila melanogaster] >pir|S52154|S52154 acetyl-CoA synthetase - fruit fly (Drosophila melanogaster) >sp|Q24226|Q24226 ACETYL-COENZYME A SYNTHETASE (EC 6.2.1.1) (ACETATE--COA LIGASE) (ACYL-ACTIVATING ENZYME). Length = 581	gi|608694	2	1237	65	77	HBKDN33
182	832317	11kD protein [Homo sapiens] Length = 111	gi|897917	270	719	100	100	HBIAX17
183	832354			1	408			HBBBE52
184	832364			3	1385			HDPQA93
185	832378	sialidase [Homo sapiens] >gi|2773339 (AF040958) lysosomal neuraminidase precursor [Homo sapiens] >gi|4099141 lysosomal sialidase [Homo sapiens] >sp|Q99519|Q99519 SIALIDASE PRECURSOR. >sp|G4099141|G4099141 LYSOSOMAL SIALIDASE PRECURSOR (EC 3.2.1.18). Lengt	gnl|PID|e303801	3	746	96	96	HATCO72
186	832385	(AF048700) gastrointestinal peptide [Homo sapiens] >sp|O60575|O60575 GASTROINTESTINAL PEPTIDE. Length = 86	gi|2935440	2	316	90	90	HARAG42
187	832428	APO-1 ANTIGEN, FAS ANTIGEN. Length = 335	sp|G249613|G249613	136	846	97	97	HAMGD53
188	832485			202	597			HAGHC54

189	832494	Ku protein subunit [Homo sapiens] >gi|178650 p70 autoantigen [Homo sapiens] >gi|339667 thyroid autoantigen [Homo sapiens] >bbs|107206 Ku autoantigen p70 subunit [human, Peptide, 609 aa] [Homo sapiens] >pir|A30299|A30894 70K thyroid autoantigen - human >sp	gi|307095	80	1918	90	90	HAIBY70
190	832512	Similar to Human C219-reactive peptide (L34688) [Homo sapiens] >sp|Q92580|Q92580 MYELOBLAST KIA0268 (FRAGMENT). >gi|511639 C219-reactive peptide [Homo sapiens] {SUB 592-727} Length = 1193	gnl|PID|d1014138	3	1058	87	87	HDPTT16
191	832515	integrin alpha6 subunit [Homo sapiens] Length = 1067	gi|33942	2	1660	96	96	HCRPH70
192	832526	nuclear factor RIP140 [Homo sapiens] >pir|S57348|S57348 nuclear factor RIP140 - human Length = 1158	gi|940539	34	693	95	95	HADCX04
193	832575	protein tyrosine kinase [Homo sapiens] >pir|A55922|A55922 tyrosine kinase A6 - human >sp|Q12792|Q12792 PROTEIN TYROSINE KINASE. Length = 350	gi|451482	49	1203	99	99	H2LAJ21
194	832576	BTG1 gene product [Homo sapiens] >gi|293306 BTG1 [Mus musculus] >gi|50188 btg1 [Mus musculus] >pir|S20947|S20947 BTG1 protein - human >pir|I48272|I48272 btg1 protein - mouse >sp|P31607|BTG1_HUMAN BTG1 PROTEIN (B-CELL TRANSLOCATION GENE 1 PROTEIN). Length	gi|29509	388	1050	100	100	HKGAJ67

195	832588	mitochondrial ATP synthase subunit 9 precursor [Homo sapiens] >pir|I38612|I38612 ATP synthase chain 9 precursor, mitochondrial - human >sp|P48201|AT93_HUMAN ATP SYNTHASE LIPID-BINDING PROTEIN P3 PRECURSOR (EC 3.6.1.34) (ATPASE PROTEIN 9) (SUBUNIT C). Leng	gi|511450	2	637	85	85	H2LAD51
196	832634			253	924			HCRMZ25
197	832728			3	542			HKAIL83
198	833094	immunoglobulin from VH4 family [Homo sapiens] >pir|S13519|S13519 Ig heavy chain V region precursor - human >gi|553385 immunoglobulin heavy chain [Homo sapiens] {SUB 24-125} Length = 147	gi|37725	2	391	77	81	HRADC46
199	833395			224	853			HHENV68
200	834326	novel stromal cell protein [Mus musculus] >pir|JC4761|JC4761 recombination activating gene I inducing protein - human >sp|Q62275|Q62275 RECOMBINATION ACTIVATING PROTEIN I PROTEIN ACTIVATION (NOVEL STROMAL CELL PROTEIN). Length = 221	gnl|PID|e229590	1	744	69	76	HWLEQ41
201	834583	(AF073957) CXC chemokine BRAK [Homo sapiens] Length = 99	gi|4140394	2	607	98	100	HHGDE66
202	834944	(AF061443) G protein-coupled receptor LGR4 [Rattus norvegicus] >sp|G3885470|G3885470 G PROTEIN-COUPLED RECEPTOR LGR4. Length	gi|3885470	2	781	85	86	HE8QE56

= 951

203	835012			3	344			HCCMD55
204	835104	(AB017169) Slit-3 protein [Homo sapiens] >sp|D1036172|D1036172 SLIT-3 PROTEIN. >gnl|PID|d1033429 (AB011538) MEGF5 [Homo sapiens] {SUB 785-1523} Length = 1523	gnl|PID|d1036172	580	1818	92	92	HLHTJ57
205	835332	(AF065389) tetraspan NET-4 [Homo sapiens] >sp|O60746|O60746 TETRASPAN NET-4. Length = 268	gi|3152703	268	1080	100	100	HCROP84
206	835487	(AC002528) alpha2(I) collagen [Homo sapiens] >sp|G2388555|G2388555 ALPHA2(I) COLLAGEN (FRAGMENT). Length = 1186	gi|2388555	2218	4239	100	100	HTSGZ29
207	836182			39	398			HFLUE31
208	836522			1819	2046			HSLFO17
209	836655			1	624			HTPCU04
210	836787	calmodulin-dependent protein kinase II-delta (EC 2.7.1.37) [Rattus norvegicus] >pir|A34366|A34366 Ca2+/calmodulin-dependent protein kinase (EC 2.7.1.123) II delta chain - rat >sp|P15791|KCCD_RAT CALCIUM/CALMODULIN-DEPENDENT PROTEIN KINASE TYPE II DELTA CH	gi|203267	767	1549	92	94	HAIED73

<table>
<tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td>211</td><td>836789</td><td>GP36b glycoprotein [Homo sapiens] >pir|G01447|G01447 GP36b glycoprotein - human >sp|Q12907|Q12907 GP36B GLYCOPROTEIN PRECURSOR. Length = 356</td><td>gi|505652</td><td>1</td><td>849</td><td>99</td><td>99</td><td>HKAAD74</td></tr>
<tr><td>212</td><td>838577</td><td>binding protein [Oryctolagus cuniculus] >gi|182628 FK506-binding protein (FKBP) [Homo sapiens] >gi|182633 FKBP-12 protein [Homo sapiens] >gi|182649 FK506-binding protein 12 [Homo sapiens] >gi|288196 FKBP [Homo sapiens] >gi|665650 FK-506 binding protein [H</td><td>gi|165023</td><td>2</td><td>433</td><td>100</td><td>100</td><td>HCRQD09</td></tr>
<tr><td>213</td><td>838717</td><td></td><td></td><td>676</td><td>900</td><td></td><td></td><td>HE8UJ03</td></tr>
<tr><td>214</td><td>839008</td><td></td><td></td><td>2</td><td>997</td><td></td><td></td><td>HFOXS52</td></tr>
<tr><td>215</td><td>840063</td><td>(AF006751) ES/130 [Homo sapiens] >sp|O75300|O75300 ES/130. Length = 977</td><td>gi|3299885</td><td>3</td><td>2729</td><td>84</td><td>85</td><td>HWLHX68</td></tr>
<tr><td>216</td><td>840533</td><td></td><td></td><td>183</td><td>482</td><td></td><td></td><td>HWLLU74</td></tr>
<tr><td>217</td><td>840669</td><td></td><td></td><td>474</td><td>1115</td><td></td><td></td><td>HPMGM71</td></tr>
<tr><td>218</td><td>841140</td><td>(AF081281) lysophospholipase [Homo sapiens] >sp|O75608|O75608 LYSOPHOSPHOLIPASE. Length = 230</td><td>gi|3415123</td><td>1</td><td>789</td><td>100</td><td>100</td><td>HAJCC51</td></tr>
<tr><td>219</td><td>841386</td><td>polypeptide GalNAc transferase-T4 [Mus musculus] >sp|O08832|O08832 POLYPEPTIDE GALNAC TRANSFERASE-T4. Length = 578</td><td>gi|2121220</td><td>491</td><td>1258</td><td>66</td><td>81</td><td>HMCCA66</td></tr>
<tr><td>220</td><td>841480</td><td></td><td></td><td>3</td><td>212</td><td></td><td></td><td>HDQET68</td></tr>
<tr><td>221</td><td>841509</td><td></td><td></td><td>3</td><td>662</td><td></td><td></td><td>HTELO87</td></tr>
<tr><td>222</td><td>841616</td><td></td><td></td><td>340</td><td>660</td><td></td><td></td><td>HWLFT95</td></tr>
</table>

223	841900	peptidylarginine deiminase (EC 3.5.3.15) [Rattus norvegicus] >pir|A34339|DIRTR1 protein-arginine deiminase (EC 3.5.3.15) I - rat >sp|P20717|PARD_RAT PROTEIN-ARGININE DEIMINASE (EC 3.5.3.15) (PEPTIDYLARGININE DEIMINASE). Length = 665	gi|205960	2	439	87	90	HWLFR87
224	842054	ubiquinone-binding protein (QP) [Homo sapiens] >gi|190816 ubiquinone-binding protein precursor [Homo sapiens] >gi|37580 ubiquinone-binding protein (AA 1 - 111) [Homo sapiens] >pir|A32450|A32450 ubiquinone-binding protein QP-C - human >gi|553631 ubiquinone	gi|190802	1	369	100	100	HWHPF06
225	843061	(AB012933) acyl-CoA synthetase 5 [Rattus norvegicus] >sp|O88813|LCFE_RAT LONG-CHAIN-FATTY-ACID--COA LIGASE 5 (EC 6.2.1.3) (LONG-CHAIN ACYL-COA SYNTHETASE 5) (LACS 5). Length = 683	gnl|PID|d1034547	23	2308	81	92	HDAAV92
226	843544			2	391			HFLNB80
227	844092	(AF045573) FLI-LRR associated protein-1 [Mus musculus] >sp|O70323|O70323 FLIGHTLESS-I ASSOCIATED PROTEIN 1 (LRR DOMAIN) (FLI-LRR ASSOCIATED PROTEIN-1). Length = 628	gi|3025718	28	837	65	83	HTEKO43

<table>
<tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td>228</td><td>844270</td><td>nuclear antigen EBNA-3B [Human herpesvirus 4] >pir|S27921|S27921 nuclear antigen EBNA-3B - human herpesvirus 4 >sp|Q69139|Q69139 NUCLEAR ANTIGEN EBNA-3B. Length = 946</td><td>gi|330409</td><td>2</td><td>373</td><td>47</td><td>52</td><td>HWLBL06</td></tr>
<tr><td>229</td><td>844604</td><td>(AF071186) WW domain binding protein 11 [Mus musculus] >sp|O88539|O88539 WW DOMAIN BINDING PROTEIN 11. Length = 389</td><td>gi|3550082</td><td>170</td><td>2110</td><td>66</td><td>70</td><td>HNTAD40</td></tr>
<tr><td>230</td><td>844685</td><td>immunoglobulin lambda heavy chain [Homo sapiens] >gi|567132 This CDS feature is included to show the translation of the corresponding C_region. Presently translation qualifiers on C_region features are illegal [Homo sapiens] {SUB 148-177} Length = 477</td><td>gnl|PID|e1227585</td><td>539</td><td>1564</td><td>94</td><td>94</td><td>HASAC08</td></tr>
<tr><td>231</td><td>844855</td><td>titin [Oryctolagus cuniculus] >sp|E1355301|E1355301 TITIN (FRAGMENT). Length = 2000</td><td>gnl|PID|e1355301</td><td>3</td><td>1634</td><td>34</td><td>54</td><td>HAICQ70</td></tr>
<tr><td>232</td><td>845101</td><td>(AF089814) growth suppressor related [Homo sapiens] >sp|O75956|O75956 GROWTH SUPPRESSOR RELATED. Length = 126</td><td>gi|3661529</td><td>46</td><td>627</td><td>94</td><td>94</td><td>HHESZ77</td></tr>
<tr><td>233</td><td>845141</td><td></td><td></td><td>31</td><td>966</td><td></td><td></td><td>HWMFO67</td></tr>
<tr><td>234</td><td>845220</td><td>(AB011105) KIAA0533 protein [Homo sapiens] >sp|O15230|O15230 KIAA0533 PROTEIN (LAMININ ALPHA 5 CHAIN) (FRAGMENT). >gnl|PID|e317479 laminin alpha 5 chain [Homo sapiens] {SUB 693-1645} Length = 1645</td><td>gnl|PID|d1026389</td><td>2</td><td>1096</td><td>100</td><td>100</td><td>HKADF64</td></tr>
</table>

235	845434	glutathione peroxidase [Synechocystis sp.] >pir|S75885|S75885 glutathione peroxidase homolog - Synechocystis sp. (PCC 6803) >sp|P74250|P74250 GLUTATHIONE PEROXIDASE (EC 1.11.1.9). Length = 169	gnl|PID|d1019077	3	590	50	61	HWAFI12
236	845510	dipeptidyl peptidase III [Rattus norvegicus] >sp|O55096|O55096 DIPEPTIDYL PEPTIDASE (EC 3.4.14.4) (DIPEPTIDYL PEPTIDASE III) (DIPEPTIDYL AMINOPEPTIDASE III) (DIPEPTIDYL ARYLAMIDASE III) (RED CELL ANGIOTENSINASE) (ENKEPHALINASE B). Length = 827	gnl|PID|d1025528	3	683	96	98	HEONN92
237	845600	preprocathepsin B [Homo sapiens] >pir|A26498|KHHUB cathepsin B (EC 3.4.22.1) precursor - human >sp|P07858|CATB_HUMAN CATHEPSIN B PRECURSOR (EC 3.4.22.1) (CATHEPSIN B1) (APP SECRETASE). >gi|181178 lysosomal proteinase cathepsin B [Homo sapiens] {SUB 131-33	gi|181192	223	1254	99	99	HOEME38
238	845882	(AF055666) kinesin light chain 2 [Mus musculus] >sp|O88448|O88448 KINESIN LIGHT CHAIN 2. Length = 599	gi|3347848	4	1155	68	75	HLHCE82

239	846007	alpha-1-acid glycoprotein 2 [Homo sapiens] >pir|JT0326|OMHU2 alpha-1-acid glycoprotein 2 precursor - human >sp|P19652|A1AH_HUMAN ALPHA-1-ACID GLYCOPROTEIN 2 PRECURSOR (AGP 2) (OROSOMUCOID 2) (OMD 2). >gi|388511 alpha 1-acid glycoprotein [Homo sapiens] {SU	gi|177840	1	390	98	100	HLDBS16
240	846280			31	105			HCNAK57
241	846286	epididymal apical protein I-precursor [Macaca fascicularis] >pir|S28258|S28258 androgen-regulated epididymal protein precursor - crab-eating macaque >sp|Q28475|Q28475 EPIDIDYMAL APICAL PROTEIN I-PRECURSOR. Length = 776	gi|38063	203	901	36	54	HASDA19
242	846388			3	1721			HL3AA32
243	HCRNG17R			154	288			HCRNG17
244	HWMFG64R			1	315			HWMFG64
245	HAGCZ94R			13	102			HAGCZ94
246	HBJEJ74R			72	287			HBJEJ74
247	HUFBE67R			355	525			HUFBE67
248	HUTHM43R			2	55			HUTHM43
249	HLTGU75R			2	274			HLTGU75
250	HWLKF77R			51	134			HWLKF77
251	HWLLK67R			1	180			HWLLK67
252	HDQIE85R			3	203			HDQIE85
253	HWLFA67R			1	213			HWLFA67
254	HWLGX29R			136	351			HWLGX29
255	HWMFZ29R			324	404			HWMFZ29

256	HNTRR03R			1	363			HNTRR03
257	H6EEP19R			2	103			H6EEP19
258	HJMAM83R			2	352			HJMAM83
259	HAGHF58R	(AB018797) calmodulin B [Halocynthia roretzi] >sp|D1034943|D1034943 CALMODULIN B. Length = 149	gnl|PID|d1034943	1	138	88	88	HAGHF58
260	HDPHG48R	(AC005031) neuronal apoptosis inhibitory protein [Homo sapiens] >sp|O75857|O75857 NEURONAL APOPTOSIS INHIBITORY PROTEIN (FRAGMENT). Length = 1178	gi|3688110	1	354	98	99	HDPHG48
261	HWLUL19R	(AC005154) similar to protein U28928 (PID:g861306) [Homo sapiens] >sp|O75223|O75223 WUGSC:H_DJ0777O23.1 PROTEIN. Length = 188	gi|3242764	2	211	59	62	HWLUL19
262	HWLLI56R	(AD000684) liver-specific bHLH-Zip transcription factor [Homo sapiens] >sp|O00112|O00112 LIVER-SPECIFIC BHLH-ZIP TRANSCRIPTION FACTOR (FRAGMENT). Length = 429	gi|1905918	1	489	61	65	HWLLI56
263	HWMAA87R	(AF001904) 3-hydroxyacyl-CoA dehydrogenase isoform 2 [Homo sapiens] >sp|O00397|O00397 3-HYDROXYACYL-COA DEHYDROGENASE ISOFORM 2 (FRAGMENT). Length = 76	gi|2108130	3	92	86	86	HWMAA87
264	HGLAT96R	(AF007861) ce-Mago [Caenorhabditis elegans] >sp|O16104|O16104 CE-MAGO (FRAGMENT). Length = 147	gi|2306971	165	359	91	91	HGLAT96

265	HCDMC32R	(AF014118) membrane-associated kinase [Homo sapiens] >sp|O14731|O14731 MEMBRANE-ASSOCIATED KINASE. Length = 499	gi|2460023	3	272	100	100	HCDMC32
266	HCROF25R	(AF034800) liprin-alpha3 [Homo sapiens] >sp|G3309535|G3309535 LIPRIN-ALPHA3 (FRAGMENT). Length = 443	gi|3309535	70	381	60	65	HCROF25
267	HTEQO80R	(AF035840) NADH:ubiquinone oxidoreductase B17 subunit [Homo sapiens] >sp|G3800740|G3800740 NADH:UBIQUINONE OXIDOREDUCTASE B17 SUBUNIT. Length = 128	gi|3800740	1	327	100	100	HTEQO80
268	H2LAU18R	(AF035940) similar to mago nashi [Homo sapiens] >gi|2330011 (AF007862) mm-Mago [Mus musculus] >gi|2909828 (AF035939) similar to mago nashi [Mus musculus] >sp|O35169|O35169 MM-MAGO. >sp|G2909830|G2909830 MAGOH. >sp|P50606|MGN_HUMAN MAGO NASHI PROTEIN HOMOL	gi|2909830	2	592	100	100	H2LAU18
269	HTXPO87R	(AF038129) polyubiquitin [Ovis aries] >sp|O46543|O46543 POLYUBIQUITIN. >gnl|PID|e1263307 unnamed protein product [unidentified] {SUB 77-305} >gi|163575 polyubiquitin [Bos taurus] {SUB 142-305} >gi|1762374 polyubiquitin [Gallus gallus] {SUB 1-71} >gnl|PID|	gi|2707837	1	330	97	97	HTXPO87

270	H2LAR08R	(AF040642) contains similarity to RNA recognition motifs (RNP) [Caenorhabditis elegans] >sp|O44795|O44795 C50D2.5 PROTEIN. Length = 200	gi|2746787	188	514	75	90	H2LAR08
271	HADAF94R	(AF044957) NADH:ubiquinone oxidoreductase B15 subunit [Homo sapiens] Length = 129	gi|4164446	88	135	88	88	HADAF94
272	HEMDA91R	(AF047473) testis mitotic checkpoint BUB3 [Homo sapiens] >sp|O43685|O43685 TESTIS MITOTIC CHECKPOINT BUB3. Length = 326	gi|3378104	132	431	85	85	HEMDA91
273	HWMFN58R	(AF051426) slow delayed rectifier channel subunit [Homo sapiens] >sp|O60607|O60607 SLOW DELAYED RECTIFIER CHANNEL SUBUNIT. Length = 548	gi|2961249	3	344	100	100	HWMFN58
274	HCNDJ66R	(AF054643) lambda I immunoglobulin light chain variable region [Homo sapiens] >gi|3023109 (AF054643) lambda I immunoglobulin light chain variable region [Homo sapiens] Length = 125	gi|3023109	1	276	72	73	HCNDJ66
275	HOHDH05R	(AF061833) aldehyde dehydrogenase; retinal dehydrogenase; class I aldehyde dehydrogenase; ALDH1 [Xenopus laevis] >sp|G3818533|G3818533 ALDEHYDE DEHYDROGENASE (EC 1.2.1.3). >pir|S51188|S51188 aldehyde dehydrogenase (NAD+) (EC 1.2.1.3), cytosolic - clawed f	gi|3818533	59	331	53	80	HOHDH05

276	HUFBP63R	(AF062137) immunoglobulin heavy chain variable region [Homo sapiens] Length = 143	gi|3170737	17	463	92	96	HUFBP63
277	HUFBN90R	(AF062211) immunoglobulin heavy chain variable region [Homo sapiens] Length = 149	gi|3170885	26	463	94	96	HUFBN90
278	HEBEJ57R	(AF062214) immunoglobulin heavy chain variable region [Homo sapiens] Length = 142	gi|3170895	1	165	81	90	HEBEJ57
279	HDTDK65R	(AF069048) immunoglobulin light chain variable region [Homo sapiens] Length = 120	gi|3328006	3	434	76	78	HDTDK65
280	HAIAD82R	(AF069711) urokinase [Oryctolagus cuniculus] >sp|G3982741|G3982741 UROKINASE (FRAGMENT). Length = 128	gi|3982741	1	156	68	71	HAIAD82
281	HFKHD61R	(AF073298) 4F5rel [Homo sapiens] >gi|3641536 (AF073297) 4F5rel [Mus musculus] >sp|O75918|O75918 4F5REL.. >sp|O88891|O88891 4F5REL. Length = 59	gi|3641538	3	203	100	100	HFKHD61
282	H2LAX28R	(AF078817) high mobility group protein [Nannospalax ehrenbergi] >sp|O88611|O88611 HIGH MOBILITY GROUP PROTEIN. Length = 215	gi|3342571	206	568	97	97	H2LAX28
283	HWLMY93R	(AF078839) Rho related protein Rnd3/Rho8 [Sus scrofa] >sp|O77683|O77683 RHO RELATED PROTEIN RND3/RHO8. Length = 244	gi|3386532	3	173	91	91	HWLMY93
284	HTXNL13R			3	356			HTXNL13

285	HDPWR89R	(AJ005259) homologous to Bombyx mori multiprotein bridging factor (EMBL: AB001078) [Homo sapiens] >sp|O60869|O60869 EDF-1 PROTEIN. Length = 148	gnl|PID|e1286414	1	312	79	83	HDPWR89
286	H2LAK62R			22	165			H2LAK62
287	HWLKT15R	(AJ235272) UBIQUINONE/MENAQUINONE BIOSYNTHESIS METHLYTRANSFERASE UBIE (ubiE) [Rickettsia prowazekii]	gnl|PID|e1342961	2	301	50	76	HWLKT15
288	HATAR77R	(AL021546) Cytochrome C Oxidase Polypeptide VIa-liver precursor (EC 1.9.3.1) [Homo sapiens]	gnl|PID|e1248288	3	413	70	73	HATAR77
289	HWLWN07R	(AL022237) bK1191B2.2 (BCL2-interacting killer (apoptosis-inducing) (NBK, BP4, BIP1)) [Homo sapiens] >sp|E1359316|E1359316 BK1191B2.2 (BCL2-INTERACTING KILLER (APOPTOSIS-INDUCING) (NBK, BP4, BIP1)) (FRAGMENT). >gi|929655 NBK [Homo sapiens] {SUB 14-173} Le	gnl|PID|e1359316	1	183	82	88	HWLWN07
290	HWLDI18R	(AL023554) ribosomal protein [Schizosaccharomyces pombe] >sp|O60118|O60118 RIBOSOMAL PROTEIN. Length = 157	gnl|PID|e1292696	3	206	43	59	HWLDI18
291	HWMEC68R			3	419			HWMEC68

292	HTXFO53R	11 beta-hydroxysteroid dehydrogenase type II [Homo sapiens] >pir|I38858|I38858 11beta-hydroxysteroid dehydrogenase (EC 1.1.1.146) type 2 - human >sp|P80365|DHI2_HUMAN CORTICOSTEROID 11-BETA-DEHYDROGENASE, ISOZYME 2 (EC 1.1.1.146) (11- DH2) (11-BETA-HYDROX	gi|565082	3	236	88	94	HTXFO53
293	HWMEH18R	3',5'-cyclic-GMP phosphodiesterase (EC 3.1.4.35) alpha chain - human >gi|3513491 (AF022380) rod photoreceptor cGMP phosphodiesterase alpha subunit [Homo sapiens] {SUB 1-122} Length = 859	pir|B34611|B34611	3	203	92	92	HWMEH18
294	HCWFF03R	5' half of the product is homologues to Bacillus subtiis SAICAR synthetase, 3' half corresponds to the catalytic subunit of AIR carboxylase [Homo sapiens] >pir|S14147|S14147 multifunctional purine biosynthesis protein - human Length = 425	gi|28384	3	296	83	90	HCWFF03
295	HCNDP66R	A33 antigen precursor [Homo sapiens] >sp|Q99795|A33_HUMAN CELL SURFACE A33 ANTIGEN PRECURSOR. Length = 319	gi|1814277	3	503	73	75	HCNDP66
296	HCRMK82R	adenosine A2b receptor [Homo sapiens] >gi|757911 A2b adenosine receptor [Homo sapiens] >pir|JC1229|JC1229 adenosine receptor A2b - human >sp|P29275|AA2B_HUMAN	gi|178150	2	427	100	100	HCRMK82

		ADENOSINE A2B RECEPTOR. Length = 332						
297	HCDAN16R	alpha-1 collagen (I) [Gallus gallus] Length = 143	gi|555432	2	133	77	88	HCDAN16
298	HCEOE88R	amplaxin [Homo sapiens] >pir|A48063|A48063 mammary tumor/squamous cell carcinoma-associated protein EMS1 - human Length = 550	gi|182087	1	291	93	94	HCEOE88
299	HALSK30R	angiogenin [Homo sapiens] >pir|A90498|NRHUAG angiogenin precursor - human >sp|P03950|ANGI_HUMAN ANGIOGENIN PRECURSOR (EC 3.1.27.-). Length = 147	gi|178250	189	416	74	76	HALSK30
300	HDRME43R	anonymous [Homo sapiens] >pir|I39463|I39463 gene anonymous protein - human >sp|Q13769|Q13769 ANONYMOUS. Length = 683	gi|388012	2	346	94	95	HDRME43
301	HHEFA24R	APP-binding protein 1 [Rattus norvegicus] >sp|G4099878|G4099878 APP-BINDING PROTEIN 1. Length = 534	gi|4099878	10	177	63	65	HHEFA24
302	HSSGC52R	argininosuccinate synthetase [Bos taurus] >sp|P14568|ASSY_BOVIN ARGININOSUCCINATE SYNTHASE (EC 6.3.4.5) (CITRULLINE--ASPARTATE LIGASE). Length = 412	gi|162697	1	438	94	95	HSSGC52

303	HCYBN49R	ATP synthase beta subunit precursor [Homo sapiens] >pir|A33370|A33370 H+-transporting ATP synthase (EC 3.6.1.34) beta chain precursor, mitochondrial - human >sp|P06576|ATPB_HUMAN ATP SYNTHASE BETA CHAIN. MITOCHONDRIAL PRECURSOR (EC 3.6.1.34). >gi|28931 be	gi|179281	56	445	97	97	HCYBN49
304	HWMGB90R	ATP synthase subunit e [Homo sapiens] >sp|P56385|ATPJ_HUMAN ATP SYNTHASE E CHAIN, MITOCHONDRIAL (EC 3.6.1.34). {SUB 2-69} Length = 69	gi|2605592	1	165	58	61	HWMGB90
305	HTEAW21R	ATPase coupling factor 6 subunit [Homo sapiens] >pir|JT0563|JT0563 coupling factor 6 precursor, mitochondrial - human >sp|P18859|ATPR_HUMAN ATP SYNTHASE COUPLING FACTOR 6, MITOCHONDRIAL PRECURSOR (EC 3.6.1.34) (F6). Length = 108	gi|179275	47	259	93	93	HTEAW21
306	HCQCV96R	ATPase subunit 6 [Homo sapiens] >sp|Q34772|Q34772 ATP SYNTHASE A CHAIN (EC 3.6.1.34). Length = 226	gnl|PID|d1007873	147	368	58	61	HCQCV96
307	HLTDN74R	autotaxin-t [Homo sapiens] >sp|Q13822|Q13822 AUTOTAXIN-T. >gnl|PID|d1008938 phosphodiesterase I alpha [Homo sapiens] {SUB 1-45} Length = 863	gi|1160616	2	118	85	85	HLTDN74
308	HDABV61R	B-creatine kinase [Gallus gallus] Length = 65	gi|211524	3	230	93	100	HDABV61

<table>
<tr><td>309</td><td>H2LAQ68R</td><td>beta prime cop [Bos taurus] >pir|S35312|S35312 coatomer complex beta' chain - bovine >sp|P35605|COPP_BOVIN COATOMER BETA' SUBUNIT (BETA'-COAT PROTEIN) (BETA'-COP) (P102). {SUB 2-906} Length = 906</td><td>gi|312732</td><td>127</td><td>558</td><td>100</td><td>100</td><td>H2LAQ68</td></tr>
<tr><td>310</td><td>HDTLN42R</td><td>beta-2-microglobulin [Pan troglodytes] >gi|177065 beta-2-microglobulin [Gorilla gorilla] >gnl|PID|d1036168 (AB021288) beta 2-microglobulin [Homo sapiens] >pir|A90976|MGHUB2 beta-2-microglobulin precursor - human >pir|I36963|I36963 beta-2-microglobulin pre</td><td>gi|176827</td><td>2</td><td>361</td><td>86</td><td>86</td><td>HDTLN42</td></tr>
<tr><td>311</td><td>HULFN47R</td><td>beta-2-microglobulin [Pan troglodytes] >gi|177065 beta-2-microglobulin [Gorilla gorilla] >gnl|PID|d1036168 (AB021288) beta 2-microglobulin [Homo sapiens] >pir|A90976|MGHUB2 beta-2-microglobulin precursor - human >pir|I36963|I36963 beta-2-microglobulin pre</td><td>gi|176827</td><td>3</td><td>449</td><td>88</td><td>89</td><td>HULFN47</td></tr>
<tr><td>312</td><td>HCRMI41R</td><td></td><td></td><td>1</td><td>528</td><td></td><td></td><td>HCRMI41</td></tr>
<tr><td>313</td><td>HWLIP53R</td><td></td><td></td><td>2</td><td>499</td><td></td><td></td><td>HWLIP53</td></tr>
<tr><td>314</td><td>HBAAD60R</td><td></td><td></td><td>2</td><td>463</td><td></td><td></td><td>HBAAD60</td></tr>
<tr><td>315</td><td>HCROA35R</td><td></td><td></td><td>3</td><td>500</td><td></td><td></td><td>HCROA35</td></tr>
<tr><td>316</td><td>HCROM64R</td><td></td><td></td><td>201</td><td>512</td><td></td><td></td><td>HCROM64</td></tr>
<tr><td>317</td><td>HEOPS84R</td><td></td><td></td><td>2</td><td>388</td><td></td><td></td><td>HEOPS84</td></tr>
<tr><td>318</td><td>HKBAG82R</td><td></td><td></td><td>32</td><td>265</td><td></td><td></td><td>HKBAG82</td></tr>
<tr><td>319</td><td>HUTSB76R</td><td></td><td></td><td>188</td><td>418</td><td></td><td></td><td>HUTSB76</td></tr>
</table>

320	HWLJS67R			384	662			HWLJS67
321	HWLLZ82R			2	133			HWLLZ82
322	HCROM20R			351	557			HCROM20
323	HDQMC24R			1	144			HDQMC24
324	HOCTD89R			212	352			HOCTD89
325	HTGAZ53R			198	341			HTGAZ53
326	HWLKZ47R			429	626			HWLKZ47
327	HWLLL51R			204	416			HWLLL51
328	HRLAJ54R			207	548			HRLAJ54
329	HBAAD69R			1	456			HBAAD69
330	HWLJZ72R			25	453			HWLJZ72
331	HWMFG06R			43	321			HWMFG06
332	HPRTO65R	biliary glycoprotein a [Homo sapiens] >gnl|PID|d1015047 biliary glycoprotein, BGPg [Homo sapiens] >gi|3172151 (AC004785) BGPg_HUMAN [Homo sapiens] >pir|JH0394|JH0394 biliary glycoprotein g precursor - human Length = 417	gi|179438	2	166	93	97	HPRTO65
333	HUFDC01R	biliary glycoprotein I precursor [Homo sapiens] >gi|37198 TM1-CEA preprotein [Homo sapiens] >gi|3172148 (AC004785) BGP1_HUMAN [Homo sapiens] >pir|A32164|A32164 biliary glycoprotein 1 precursor - human >sp|P13688|BGP1_HUMAN BILIARY GLYCOPROTEIN 1 PRECURSOR	gi|179440	108	326	87	87	HUFDC01
334	HWLHY44R	bone-derived growth factor [Homo sapiens] >sp|Q13876|Q13876 BONE-DERIVED GROWTH FACTOR (FRAGMENT). Length = 793	gi|1203965	3	413	75	79	HWLHY44

335	HWLGR92R	brain glycogen phosphorylase [Homo sapiens] >pir|A29949|A29949 glycogen phosphorylase (EC 2.4.1.1), brain (astrocytoma cell line) - human Length = 863	gi|307200	122	238	100	100	HWLGR92
336	HCNCQ71R	CAG-isl 7 [Homo sapiens] Length = 213	gi|3126984	1	93	66	77	HCNCQ71
337	HBMCI28R	carbonic anhydrase I (EC 4.2.1.1) [Homo sapiens] >gi|29600 carbonic anhydrase I (AA 1-261) [Homo sapiens] >pir|JQ0786|CRHU1 carbonate dehydratase (EC 4.2.1.1) I - human >sp|P00915|CAH1_HUMAN CARBONIC ANHYDRASE I (EC 4.2.1.1) (CARBONATE DEHYDRATASE I). {SU	gi|179793	81	293	84	84	HBMCI28
338	HWLEN11R	carbonic anhydrase I (EC 4.2.1.1) [Homo sapiens] >gi|29600 carbonic anhydrase I (AA 1-261) [Homo sapiens] >pir|JQ0786|CRHU1 carbonate dehydratase (EC 4.2.1.1) I - human >sp|P00915|CAH1_HUMAN CARBONIC ANHYDRASE I (EC 4.2.1.1) (CARBONATE DEHYDRATASE I). {SU	gi|179793	84	347	80	80	HWLEN11
339	HMSDU92R	carbonic anhydrase II [Homo sapiens] >gi|179780 carbonic anhydrase II [Homo sapiens] >gi|179795 carbonic anhydrase II [Homo sapiens] >gi|29587 carbonic anhydrase II (AA 1-260) [Homo sapiens] >pir|A27175|CRHU2 carbonate dehydratase (EC 4.2.1.1) II - human	gi|179772	1	360	76	83	HMSDU92

340	HCDBF89R	carbonic anhydrase IV [Homo sapiens] >gi|409726 carbonic anhydrase IV [Homo sapiens] {SUB 73-294} Length = 294	gi|409725	11	160	87	90	HCDBF89
341	HCNDP16R	carboxylesterase hCE-2 [Homo sapiens] >sp|Q16859|Q16859 CARBOXYLESTERASE (EC 3.1.1.1) (ALI-ESTERASE) (B-ESTERASE) (MONOBUTYRASE) (COCAINE ESTERASE) (PROCAINE ESTERASE) (METHYLBUTYRASE). Length = 550	gi|1407780	1	252	70	71	HCNDP16
342	HWLGX53R	carcinoembryonic antigen [Homo sapiens] >gi|178677 carcinoembryonic antigen precursor [Homo sapiens] >pir|A36319|A36319 carcinoembryonic antigen precursor - human >sp|P06731|CCEM_HUMAN CARCINOEMBRYONIC ANTIGEN PRECURSOR (CEA) (MECONIUM ANTIGEN 100) (CD66E	gi|180223	19	138	73	73	HWLGX53
343	HWLEH56R	carcinoembryonic antigen [Homo sapiens] >gnl|PID|e249945 carcinoembryonic antigen [Homo sapiens] >gi|3702266 (AC005797) carcinoembryonic antigen CGM2 precursor - human [Homo sapiens] >pir|A55811|A55811 carcinoembryonic antigen CGM2 precursor - human >sp|Q	gi|471077	1	453	86	87	HWLEH56

344	H2LAD26R	CArG box-binding factor [Mus musculus] >gnl|PID|d1014884 CArG-binding factor-A [Mus musculus] >pir|JQ0448|JQ0448 CArG-binding factor-A - mouse >sp|Q99020|CABA_MOUSE CARG-BINDING FACTOR-A (CBF-A). Length = 285	gi|840648	43	387	98	98	H2LAD26
345	HADAF48R	CD99 typeII [Homo sapiens] >sp|O00518|O00518 CD99 TYPEII. Length = 160	gi|2149135	2	151	59	59	HADAF48
346	HCRNV62R	Cdc6-related protein [Homo sapiens] >gi|2465437 (AF022109) HsCdc18p [Homo sapiens] >sp|Q99741|Q99741 CDC6-RELATED PROTEIN. Length = 560	gi|1684903	2	442	90	91	HCRNV62
347	HCDCI17R	chaperonin-like protein [Homo sapiens] >pir|S48087|S48087 t-complex-type molecular chaperone CCT6 - human >gi|184462 chaperonin-like protein [Homo sapiens] {SUB 143-531} Length = 531	gi|517065	3	137	97	100	HCDCI17
348	HJUAA02R	Cks1 protein homologue [Homo sapiens] >pir|A36670|A36670 protein kinase cdc2 complex subunit CKS1 - human >sp|P33551|CKS1_HUMAN CYCLIN-DEPENDENT KINASES REGULATORY SUBUNIT 1 (CKS-1). Length = 79	gi|29977	186	386	96	96	HJUAA02

349	HKAKO78R	Cks1 protein homologue [Homo sapiens] >pir|B36670|B36670 protein kinase cdc2 complex subunit CKS2 - human >sp|P33552|CKS2_HUMAN CYCLIN-DEPENDENT KINASES REGULATORY SUBUNIT 2 (CKS-2). Length = 79	gi|29979	2	193	77	77	HKAKO78
350	H2CBD02R			58	522			H2CBD02
351	HWLCR90R	contains similarity to ATP/GTP-binding site motif (PS:PS00017) [Caenorhabditis elegans] >sp|Q94180|Q94180 SIMILARITY TO ATP/GTP-BINDING SITE MOTIF. Length = 398	gi|1519671	1	351	34	60	HWLCR90
352	H2LAK66R	core protein II precursor [Homo sapiens] >pir|A32629|A32629 ubiquinol--cytochrome-c reductase (EC 1.10.2.2) core protein II - human Length = 453	gi|180928	126	632	79	79	H2LAK66
353	HSDKC65R	CoxII/D-loop DNA fusion protein [Homo sapiens] >sp|Q34777|Q34777 COXII/D-LOOP DNA FUSION PROTEIN (FRAGMENT). Length = 125	gi|1374867	179	346	95	97	HSDKC65
354	H2LAK52R	CUL-2 [Homo sapiens] >sp|Q13617|CUL2_HUMAN CULLIN HOMOLOG 2 (CUL-2). Length = 745	gi|1923243	24	608	100	100	H2LAK52
355	HKAEG12R	cyclin B1 - human >sp|P14635|CGB1_HUMAN G2/MITOTIC-SPECIFIC CYCLIN B1. Length = 433	pir|A32992|A32992	3	392	98	98	HKAEG12
356	HKADP43R	cyclin F [Homo sapiens] >sp|P41002|CG2F_HUMAN G2/MITOTIC-SPECIFIC CYCLIN F. Length = 786	gi|576781	1	375	71	71	HKADP43

357	HLXND10R	cystatin B [Homo sapiens] >gi|1235678 cystatin B [Homo sapiens] >sp|P04080|CYTB_HUMAN CYSTATIN B (LIVER THIOL PROTEINASE INHIBITOR) (CPI-B) (STEFIN B). Length = 98	gi|291927	2	355	100	100	HLXND10
358	HUSJE17R	cytochrome c oxidase subunit II [Pan troglodytes] >sp|P26457|COX2_PANPA CYTOCHROME C OXIDASE POLYPEPTIDE II (EC 1.9.3.1). Length = 227	gi|336514	17	208	97	98	HUSJE17
359	HLHGH82R	cytochrome c oxidase subunit Va preprotein [Mus musculus] >pir|S05495|S05495 cytochrome-c oxidase (EC 1.9.3.1) chain Va precursor - mouse >sp|P12787|COXA_MOUSE CYTOCHROME C OXIDASE POLYPEPTIDE VA PRECURSOR (EC 1.9.3.1). Length = 145	gi|50527	2	106	94	94	HLHGH82
360	HHBEF06R	cytochrome oxidase III [Homo sapiens] >pir|A00482|OTHU3 cytochrome-c oxidase (EC 1.9.3.1) chain III - human mitochondrion (SGC1) >sp|P00414|COX3_HUMAN CYTOCHROME C OXIDASE POLYPEPTIDE III (EC 1.9.3.1). >gi|2245564 (AF004341) cytochrome c oxidase subunit I	gi|13010	167	373	75	80	HHBEF06

361	HISCW28R	cytochrome oxidase subunit II [Homo sapiens] >gi|530071 cytochrome oxidase subunit II [Homo sapiens] >gi|530073 cytochrome oxidase subunit II [Homo sapiens] >gi|530077 cytochrome oxidase subunit II [Homo sapiens] >gi|337187 cytochrome oxidase subunit II [	gi|530069	121	312	83	86	HISCW28
362	HODEN42R	cytochrome oxidase subunit II [Homo sapiens] >gi|530071 cytochrome oxidase subunit II [Homo sapiens] >gi|530073 cytochrome oxidase subunit II [Homo sapiens] >gi|530077 cytochrome oxidase subunit II [Homo sapiens] >gi|337187 cytochrome oxidase subunit II [	gi|530069	302	469	68	71	HODEN42
363	HOEMM43R	cytochrome oxidase subunit II [Homo sapiens] >gi|530071 cytochrome oxidase subunit II [Homo sapiens] >gi|530073 cytochrome oxidase subunit II [Homo sapiens] >gi|530077 cytochrome oxidase subunit II [Homo sapiens] >gi|337187 cytochrome oxidase subunit II [	gi|530069	1	180	64	67	HOEMM43
364	HPIAK29R	cytochrome oxidase subunit II [Homo sapiens] >gi|530071 cytochrome oxidase subunit II [Homo sapiens] >gi|530073 cytochrome oxidase subunit II [Homo sapiens] >gi|530077 cytochrome oxidase subunit II [Homo sapiens] >gi|337187 cytochrome oxidase subunit II [	gi|530069	295	441	63	70	HPIAK29

365	HUFAR71R	cytochrome oxidase subunit II [Homo sapiens] >gi|530071 cytochrome oxidase subunit II [Homo sapiens] >gi|530073 cytochrome oxidase subunit II [Homo sapiens] >gi|530077 cytochrome oxidase subunit II [Homo sapiens] >gi|337187 cytochrome oxidase subunit II [	gi|530069	128	367	82	85	HUFAR71
366	HHEUL74R	cytochrome oxidase subunit II [Homo sapiens] >sp|Q37526|Q37526 CYTOCHROME C OXIDASE POLYPEPTIDE II (EC 1.9.3.1). Length = 227	gi|530075	3	227	70	74	HHEUL74
367	H2LAY36R	cytosolic malate dehydrogenase [Homo sapiens] >gi|3133269 malate dehydrogenase [Homo sapiens] >sp|P40925|MDHC_HUMAN MALATE DEHYDROGENASE, CYTOPLASMIC (EC 1.1.1.37). {SUB 2-334} Length = 334	gnl|PID|d1010156	10	609	84	88	H2LAY36
368	HOECI21R	decay-accelerating factor precursor [Homo sapiens] >gnl|PID|d1023771 (AB003312) decay accelerating factor [Homo sapiens] {SUB 286-340} Length = 376	gi|181463	3	548	73	75	HOECI21
369	HKAFY51R	desmoglein 2 [Homo sapiens] >pir|S38673|S38673 desmoglein 2 - human >sp|Q14126|DSG2_HUMAN DESMOGLEIN 2 PRECURSOR (HDGC). Length = 1117	gi|416178	1	429	100	100	HKAFY51
370	HMCAR63R	diazepam binding inhibitor [Homo sapiens] Length = 104	gi|181478	3	335	100	100	HMCAR63

371	HWMAN06R	dopamine- and cAMP-regulated neuronal phosphoprotein [Sus scrofa] >sp|Q29277|PPD_PIG DOPAMINE- AND CAMP-REGULATED NEURONAL PHOSPHOPROTEIN (DARPP-32) (FRAGMENT). Length = 137	gi|972053	1	222	83	83	HWMAN06
372	HDPLD04R	early growth response 2 protein (EGR2) - human >gi|181987 early growth response 2 protein [Homo sapiens] {SUB 51-456} Length = 456	pir|A40492|A40492	1	459	69	70	HDPLD04
373	HCEGK04R	elongation factor 2 [Gallus gallus] >sp|Q90705|EF2_CHICK ELONGATION FACTOR 2 (EF-2). {SUB 2-858} Length = 858	gi|1184958	87	182	95	95	HCEGK04
374	HWLMB57R	epidermal growth factor receptor kinase substrate [Homo sapiens] >pir|I38728|I38728 epidermal growth factor receptor kinase substrate - human >sp|Q12929|EPS8_HUMAN EPIDERMAL GROWTH FACTOR RECEPTOR KINASE SUBSTRATE EPS8. Length = 822	gi|530823	1	186	93	93	HWLMB57
375	HHFHF93R	epidermal growth factor receptor precursor [Homo sapiens] >sp|P21860|ERB3_HUMAN ERBB-3 RECEPTOR PROTEIN-TYROSINE KINASE PRECURSOR (EC 2.7.1.112). >gnl|PID|e304809 unnamed protein product [Homo sapiens] {SUB 1-27} Length = 1342	gi|181980	1	180	89	89	HHFHF93

376	HCDEM69R	epiligrin alpha 3 subunit [Homo sapiens] >pir|A55347|A55347 adhesive ligand epiligrin, alpha-3 chain form A precursor - human >sp|Q16787|LMA3_HUMAN LAMININ ALPHA-3 CHAIN PRECURSOR (EPILIGRIN 170 KD SUBUNIT) (E170). Length = 1713	gi|551597	136	282	95	95	HCDEM69
377	HCHNP50R	epithelial cell marker protein 1 [Homo sapiens] >pir|S38956|S38956 epithelial cell marker protein 1 - human Length = 248	gi|187302	54	218	94	94	HCHNP50
378	HAJAW27R	ERF-1 gene product [Homo sapiens] >pir|S34854|S34854 epidermal growth factor-response factor 1 - human >gi|972116 ERF-1 protein [Sus scrofa] {SUB 299-337} Length = 338	gi|825653	3	488	100	100	HAJAW27
379	HAICY55R	G-rich sequence factor-1 [Homo sapiens] >gi|517196 G-rich sequence factor-1 [Homo sapiens] >sp|Q12849|GRF1_HUMAN G-RICH SEQUENCE FACTOR-1 (GRSF-1). >pir|S48081|S48081 GRSF-1 protein - human (fragment) {SUB 94-424} Length = 424	gi|517196	3	374	50	50	HAICY55
380	HWLIA38R	gap junction protein (aa 1-283) [Homo sapiens] >pir|B29005|B29005 gap junction protein Cx32 - human >sp|P08034|CXB1_HUMAN GAP JUNCTION BETA-1 PROTEIN (CONNEXIN 32) (CX32) (GAP JUNCTION 28 KD LIVER PROTEIN). Length = 283	gi|31647	3	455	82	85	HWLIA38

381	HBXCL69R	glutamine--phenylpyruvate aminotransferase [Homo sapiens] >pir|S69001|S52790 glutamine--phenylpyruvate transaminase (EC 2.6.1.64) - human >sp|Q16773|Q16773 GLUTAMINE--PHENYLPYRUVATE AMINOTRANSFERASE (EC 2.6.1.64) (GLUTAMINE TRANSAMINASE K). Length = 422	gi|758591	81	419	61	67	HBXCL69
382	H2LAP90R	glutathione peroxidase [Homo sapiens] Length = 202	gi|488476	234	545	97	97	H2LAP90
383	HCQCR94R	glutathione peroxidase-GI [Homo sapiens] Length = 190	gi|579930	1	114	95	95	HCQCR94
384	HTELE03R	glutathione peroxidase-GI [Homo sapiens] Length = 190	gi|579930	14	202	100	100	HTELE03
385	HJMBN86R	glutathione-insulin transhydrogenase (216 AA) [Homo sapiens] Length = 216	gi|31746	2	202	97	100	HJMBN86
386	HSKJC32R	GTP:AMP phosphotransferase (EC 2.7.4.10) [Bos taurus] >gnl|PID|d1001680 mitochondrial adenylate kinase isozyme 3 [Bos taurus] >pir|A34442|A34442 nucleoside-triphosphate--adenylate kinase (EC 2.7.4.10) 3, mitochondrial - bovine >sp|P08760|KAD3_BOVIN GTP:AM	gi|163528	1	642	89	94	HSKJC32
387	HOEAZ62R	GTP_binding protein [Sus scrofa] >sp|Q29222|Q29222 GTP_BINDING PROTEIN (FRAGMENT). Length = 92	gi|971836	2	100	89	92	HOEAZ62

388	HAOAG76R	guanine nucleotide-binding protein G-s-alpha-4 [Homo sapiens] >gi|31913 alpha-S1 (AA 1-380) [Homo sapiens] >pir|C31927|RGHUA1 GTP-binding regulatory protein Gs alpha chain (adenylate cyclase-stimulating), splice form 4 - human Length = 380	gi|386746	1	369	86	86	HAOAG76
389	HC1AD45R	guanylin [Homo sapiens] >gi|306824 guanylin [Homo sapiens] >pir|A46279|A46279 guanylin precursor - human >sp|Q02747|GUAN_HUMAN GUANYLIN PRECURSOR (GUANYLATE CYCLASE ACTIVATOR 2A). Length = 115	gi|183415	2	262	75	81	HC1AD45
390	H2MAC82R	H+-ATP synthase subunit b [Homo sapiens] >pir|JQ1144|JQ1144 H+-transporting ATP synthase (EC 3.6.1.34) chain b precursor, mitochondrial - human >sp|P24539|ATPF_HUMAN ATP SYNTHASE B CHAIN, MITOCHONDRIAL PRECURSOR (EC 3.6.1.34). Length = 256	gi|509291	214	513	95	96	H2MAC82
391	H2LAJ41R	heat shock protein [Homo sapiens] >pir|A32319|HHHU86 heat shock protein 90-alpha - human >gi|184419 heat shock protein 86 [Homo sapiens] {SUB 1-312} >gnl|PID|d1014121 heat shock protein 90 [Homo sapiens] {SUB 582-732} Length = 732	gi|703087	75	632	98	98	H2LAJ41
392	HWLGH40R	HKL1 [Homo sapiens] >sp|O60765|O60765 HKL1. Length = 605	gnl|PID|d1026110	1	597	92	93	HWLGH40

393	HBJFH33R	HLA DP4 beta-chain [Homo sapiens] >gi|296648 pot. hla-dp-beta 1 [Homo sapiens] >pir|A02229|HLHUPB MHC class II histocompatibility antigen HLA-DP beta 1 chain (allele DPB4.1) precursor - human >sp|P04440|HB2P_HUMAN HLA CLASS II HISTOCOMPATIBILITY ANTIGEN,	gi|306858	97	369	88	92	HBJFH33
394	HISDV92R	homeobox c1 protein [Homo sapiens] >sp|Q64081|Q64081 HOX-B|HOX-2 {CLONE 17A}. {SUB 137-196} Length = 217	gi|306878	51	404	72	72	HISDV92
395	HMQCG89R			158	388			HMQCG89
396	HE9QB35R	Hox5.4 gene product (AA 1-95) [Homo sapiens] >pir|B32830|B32830 homeotic protein Hox D8 - human (fragment) >sp|P13378|HXD8_HUMAN HOMEOBOX PROTEIN HOX-D8 (HOX-4E) (HOX-5.4) (FRAGMENT). Length = 95	gi|32400	1	345	100	100	HE9QB35
397	HDABQ50R	hsOrc2p [Homo sapiens] >sp|Q13416|ORC2_HUMAN ORIGIN RECOGNITION COMPLEX PROTEIN, SUBUNIT 2. Length = 577	gi|1113107	204	368	91	91	HDABQ50

398	HNTEG83R	hydroxymethylglutaryl-CoA lyase [Homo sapiens] >pir|A45470|A45470 hydroxymethylglutaryl-CoA lyase (EC 4.1.3.4) - human >sp|P35914|HMGL_HUMAN HYDROXYMETHYLGLUTARYL-COA LYASE PRECURSOR (EC 4.1.3.4) (HMG-COA LYASE) (HL) (3-HYDROXY-3-METHYLGLUTARATE-COA LYASE	gi|184503	2	391	83	83	HNTEG83
399	HFVHM90R	hydroxymethylglutaryl-CoA synthase [Homo sapiens] >gi|2463646 3-hydroxy-3-methylglutaryl CoA synthase [Homo sapiens] >pir|S71623|S71623 hydroxymethylglutaryl-CoA synthase (EC 4.1.3.5) precursor, mitochondrial - human >sp|P54868|HMCM_HUMAN HYDROXYMETHYLGLU	gi|619877	2	319	92	94	HFVHM90
400	HOSNF90R	hypothetical 18K protein (rRNA) - goldfish mitochondrion (SGC1) Length = 166	pir|JC1348|JC1348	257	340	59	62	HOSNF90
401	HSDJE56R	hypothetical 18K protein (rRNA) - goldfish mitochondrion (SGC1) Length = 166	pir|JC1348|JC1348	2	70	67	73	HSDJE56
402	HWLGC87R	hypothetical protein 2 (rRNA external transcribed spacer) - mouse Length = 153	pir|S12206|S12206	1	135	96	96	HWLGC87

403	HTPAC28R	I-plastin [Homo sapiens] >pir|A56536|A56536 plastin, intestine-specific - human >sp|Q14651|PLSI_HUMAN I-PLASTIN (INTESTINE-SPECIFIC PLASTIN). Length = 629	gi|405230	68	325	92	93	HTPAC28
404	HMCGN07R	ICK=INTRON-CONTAINING KALLIKREIN {ALTERNATIVELY SPLICED, INTRON 2}. Length = 216	sp|G998972|G998972	1	498	98	99	HMCGN07
405	HFIBV16R	Id1 gene product [Homo sapiens] >pir|S47524|S47524 gene Id1 protein - human Length = 154	gi|457785	2	238	89	89	HFIBV16
406	HBMTT01R	Ig alpha-2 chain C region (allotype A2m(1)) - human >sp|P01877|ALC2_HUMAN IG ALPHA-2 CHAIN C REGION. >gi|184761 Ig alpha-2 H-chain constant region (aa at 166) [Homo sapiens] {SUB 2-340} Length = 340	pir|B22360|B22360	2	154	80	80	HBMTT01
407	HBMVM66R	Ig gamma chain C region - chimpanzee >gnl|PID|e40518 CH2 domain of IgG [Pan troglodytes] {SUB 25-134} >gnl|PID|e40517 CH3 domain of IgG [Pan troglodytes] {SUB 135-234} Length = 234	pir|PT0207|PT0207	148	435	70	77	HBMVM66
408	HABGC21R	Ig heavy chain (DOT) - human (fragment) >gnl|PID|e4381 reading frame CH1 [Homo sapiens] {SUB 121-218} Length = 241	pir|S69131|S69131	1	228	50	56	HABGC21
409	HWLGE72R	Ig kappa light chain (VJ) [Homo sapiens] >pir|S40343|S40343 Ig kappa chain V-J region - human Length = 128	gi|441375	11	421	75	79	HWLGE72

410	HLIBX69R	IgM B-cell receptor associated protein (BAP) 37 [Mus musculus] >pir|S46996|S46996 B-cell receptor-associated protein BAP37 - mouse >sp|Q61336|Q61336 BCR-ASSOCIATED PROTEIN 37 (IGM B-CELL RECEPTOR ASSOCIATED PROTEIN 37) (BAP). Length = 298	gi|541734	1	279	100	100	HLIBX69
411	HWAFW14R	immunoglobulin from VH4 family [Homo sapiens] >pir|S13519|S13519 Ig heavy chain V region precursor - human >gi|553385 immunoglobulin heavy chain [Homo sapiens] {SUB 24-125} Length = 147	gi|37725	2	139	94	100	HWAFW14
412	HWAFK04R	immunoglobulin heavy chain [Homo sapiens] >pir|E36005|E36005 Ig heavy chain V region (M72) - human {SUB 36-157} Length = 157	gi|567126	48	473	78	86	HWAFK04
413	HEPNA09R	immunoglobulin heavy chain [Homo sapiens] >pir|G36005|G36005 Ig heavy chain V region (M74) - human {SUB 38-158} Length = 158	gi|567127	3	206	81	87	HEPNA09
414	HCRQD03R	immunoglobulin heavy chain [Homo sapiens] Length = 152	gi|567128	1	573	76	82	HCRQD03
415	HAPSK08R	immunoglobulin heavy chain variable region [Homo sapiens] >gi|903667 Ig heavy chain variable region VH [Homo sapiens] {SUB 1-97} >gi|976311 This CDS feature is included to show the translation of the corresponding V_segment. Presently translation qualifie	gi|1791017	1	363	79	81	HAPSK08

416	HBMTS11R	immunoglobulin IgH heavy chain Fd fragment [Homo sapiens] Length = 221	gi|468237	1	375	68	70	HBMTS11
417	HCNDR62R	immunoglobulin kappa light chain [Homo sapiens] >pir|A37927|A37927 Ig kappa chain C region (allotype Inv(1,2)) - human (fragment) {SUB 138-236} Length = 236	gnl|PID|e224083	245	337	100	100	HCNDR62
418	HNJBF13R	immunoglobulin lambda light chain gene product [Homo sapiens] >pir|S25738|S25738 Ig lambda chain - human Length = 231	gi|33702	3	308	90	93	HNJBF13
419	HLYCD69R	immunoglobulin lambda light chain gene product [Homo sapiens] >pir|S25743|S25743 Ig lambda chain - human (fragment) Length = 145	gi|33712	2	481	86	89	HLYCD69
420	HWAFK89R	immunoglobulin lambda light chain gene product [Homo sapiens] >pir|S25750|S25750 Ig lambda chain - human Length = 235	gi|33730	2	460	87	92	HWAFK89
421	HWCAA53R	immunoglobulin light chain variable region [Homo sapiens] >gi|3142470 (AF063703) immunoglobulin lambda light chain variable region [Homo sapiens] {SUB 20-127} >gi|575243 immunoglobulin lambda chain precursor [Homo sapiens] {SUB 26-127} >gnl|PID|d1020826 V	gi|465170	1	342	74	88	HWCAA53
422	HYAAY47R	immunoglobulin light chain variable region [Homo sapiens] Length = 154	gi|465168	2	292	70	74	HYAAY47
423	HMCJF14R			21	596			HMCJF14
424	HE8QU88R			13	141			HE8QU88

425	HFVGP11R	L-FABP [Homo sapiens] >pir|A22289|FZHUL fatty acid-binding protein, hepatic - human >sp|P07148|FABL_HUMAN FATTY ACID-BINDING PROTEIN, LIVER (L-FABP). Length = 127	gi|182358	29	322	98	98	HFVGP11
426	HWLQH07R			3	554			HWLQH07
427	HSIGN24R	lrp gene product [Homo sapiens] >pir|S57723|S57723 lrp protein - human >sp|Q14764|MVP_HUMAN MAJOR VAULT PROTEIN (MVP) (LUNG RESISTANCE-RELATED PROTEIN). Length = 896	gi|895840	2	250	89	93	HSIGN24
428	HWLKH07R	lysophosphatidic acid acyltransferase-beta [Homo sapiens] Length = 278	gi|2155240	74	298	96	97	HWLKH07
429	HAPQC14R	macrophage capping protein [Homo sapiens] >pir|A43358|A43358 macrophage capping protein - human >sp|P40121|CAPG_HUMAN MACROPHAGE CAPPING PROTEIN (ACTIN-REGULATORY PROTEIN CAP-G). >gi|515505 Cap-G [Homo sapiens] {SUB 1-172} Length = 348	gi|187456	2	538	96	98	HAPQC14
430	HSODB48R	malonyl-CoA decarboxylase (EC 4.1.1.9) - goose >gi|305323 malonyl CoA decarboxylase [Anser anser] {SUB 33-462} Length = 462	pir|A33313|A33313	32	466	77	81	HSODB48
431	HBEAC75R	membrane glycoprotein [Homo sapiens] Length = 385	gi|307132	2	217	73	79	HBEAC75
432	HBGMJ24R	mitochondrial RNA polymerase [Homo sapiens] Length = 1230	gi|2114396	3	479	100	100	HBGMJ24

433	HBJEN94R	mitotic kinase-like protein-1 [Homo sapiens] >pir|S28262|S28262 kinesin-related protein MKLP-1 - human >sp|Q02241|MKLP_HUMAN MITOTIC KINESIN-LIKE PROTEIN-1. Length = 960	gi|34672	1	327	89	89	HBJEN94
434	HCIAE73R	motor protein [Homo sapiens] Length = 721	gnl|PID|d1005183	73	324	100	100	HCIAE73
435	HCNDN88R	mucin 2 precursor, intestinal - human (fragments) >gi|186396 mucin [Homo sapiens] {SUB 626-1895} >gi|186398 MUC2 [Homo sapiens] {SUB 2037-3020} >gi|188874 intestinal mucin [Homo sapiens] {SUB 1916-2193} >gi|188615 mucin-like protein [Homo sapiens] {SUB 23	pir|A49963|A43932	1	171	95	97	HCNDN88
436	HSIDX70R	N-benzoyl-L-tyrosyl-p-amino-benzoic acid hydrolase alpha subunit [Homo sapiens] >pir|S60193|HYHUMA meprin A (EC 3.4.24.18) alpha chain precursor - human >sp|Q16819|MEPA_HUMAN MEPRIN A ALPHA-SUBUNIT PRECURSOR (EC 3.4.24.18) (ENDOPEPTIDASE-2) (N- BENZOYL-L-	gi|535475	2	253	94	94	HSIDX70

437	HLWBC39R	Na+/H+ exchanger NHE-1 isoform [human, heart, Peptide, 815 aa] [Homo sapiens] >pir|I57487|I57487 Na+/H+-exchanging protein NHE-1 - human >sp|P19634|NAH1_HUMAN SODIUM/HYDROGEN EXCHANGER 1 (NA(+)/H(+) EXCHANGER 1) (NHE-1) (NA+/H+ ANTIPORTER, AMILORIDE-SENSI	bbs|143522	2	388	77	77	HLWBC39
438	HWLAA06R	NADH dehydrogenase (ubiquinone) (EC 1.6.5.3) chain 4 - chimpanzee mitochondrion (SGC1) (fragment) >sp|P03906|NU4M_PANTR NADH-UBIQUINONE OXIDOREDUCTASE CHAIN 4 (EC 1.6.5.3) (FRAGMENT). Length = 152	pir|A00435|A00435	66	194	86	97	HWLAA06
439	HASCH25R	NADH-UBIQUINONE OXIDOREDUCTASE 39 KD SUBUNIT PRECURSOR (EC 1.6.5.3) (EC 1.6.99.3) (COMPLEX I-39KD) (CI-39KD). >gi|189049 NADH dehydrogenase (ubiquinone) [Homo sapiens] {SUB 3-377} Length = 377	sp|Q16795|NUEM_HUMAN	57	143	78	82	HASCH25
440	HLQGB87R	NADPH--ferrihemoprotein reductase (EC 1.6.2.4) - human >sp|P16435|NCPR_HUMAN NADPH-CYTOCHROME P450 REDUCTASE (EC 1.6.2.4) (CPR). {SUB 2-677} Length = 677	pir|A33421|A60557	1	411	92	93	HLQGB87

441	HFDMD17R	neutrophil gelatinase associated lipocalin [Homo sapiens] >sp|P80188|NGAL_HUMAN NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN PRECURSOR (NGAL) (P25) (25 KD ALPHA-2-MICROGLOBULIN-RELATED SUBUNIT OF MMP-9) (LIPOCALIN-2) (ONCOGENE 24P3). Length = 198	gi|929657	1	621	74	78	HFDMD17
442	HAOAC69R	nuclear autoantigen [Homo sapiens] >pir|A37244|A37244 nuclear autoantigen Sp-100 - human Length = 480	gi|178689	3	209	88	88	HAOAC69
443	HWLEQ08R	Nuclear localization signal at AA 569-573, 576-580, 579-583; acidic transcr. activ. domain 620-640.; homeobox motif 653-676 [Homo sapiens] >pir|A47456|A47456 down-regulated in adenoma (DRA) - human >sp|P40879|DRA_HUMAN DRA PROTEIN (DOWN-REGULATED IN ADENO	gi|291964	191	364	75	84	HWLEQ08
444	HKAAV70R	nucleic acid binding protein [Homo sapiens] >pir|I38191|I38191 nucleic acid binding protein - human (fragment) >sp|Q15410|Q15410 NUCLEIC ACID BINDING PROTEIN (FRAGMENT). Length = 163	gi|431953	1	432	73	73	HKAAV70

445	HOCTB64R	ORIGINAL PIGR [unidentified] >gi|456346 Polymeric immunoglobulin receptor [Homo sapiens] >bbs|62408 transmembrane secretory component, poly-Ig receptor, SC [human, colonic adenocarcinoma cell line, Peptide, 764 aa] [Homo sapiens] >bbs|113253 transmembrane	gnl|PID|e307278	3	212	85	90	HOCTB64
446	HOFNB62R	ornithine decarboxylase [Bos taurus] >gi|163449 ornithine decarboxylase [Bos taurus] >sp|P27117|DCOR_BOVIN ORNITHINE DECARBOXYLASE (EC 4.1.1.17) (ODC). >gi|604513 ornithine decarboxylase [Bos taurus] {SUB 1-34} Length = 461	gi|1036793	1	312	85	90	HOFNB62
447	HAUAU04R	p22 phagocyte b-cytochrome [Homo sapiens] >pir|A28201|A28201 cytochrome b-245 alpha chain - human >sp|P13498|C24A_HUMAN CYTOCHROME B-245 LIGHT CHAIN (P22 PHAGOCYTE B-CYTOCHROME) (NEUTROPHIL CYTOCHROME B, 22 KD POLYPEPTIDE) (P22-PHOX) (CYTOCHROME B(558) AL	gi|189106	1	267	87	88	HAUAU04
448	HNFJE41R	p47-phox [Homo sapiens] >sp|O43842|O43842 P47-PHOX. Length = 390	gi|2754713	1	423	94	97	HNFJE41
449	HCFOH92R	phosphoprotein phosphatase (EC 3.1.3.16) catalytic beta chain - pig (fragment) Length = 293	pir|B27430|B27430	2	88	93	93	HCFOH92
450	HOUID53R	phosphorylation regulatory protein HP-10 - human Length = 492	pir|A61382|A61382	85	213	45	49	HOUID53

451	HCRMW41R	polypeptide BM28 [Homo sapiens] Length = 892	gi|468704	1	282	100	100	HCRMW41
452	HOVAX78R	porin [Homo sapiens] >pir|A45972|A45972 mitochondrial porin, long form - human >sp|P45880|POR2_HUMAN VOLTAGE-DEPENDENT ANION-SELECTIVE CHANNEL PROTEIN 2 (VDAC2) (OUTER MITOCHONDRIAL MEMBRANE PROTEIN PORIN). >gi|190201 porin [Homo sapiens] {SUB 27-347} Len	gi|190200	2	214	94	98	HOVAX78
453	HWAEH57R	precursor [Homo sapiens] >sp|P06314|KV4C_HUMAN IG KAPPA CHAIN PRECURSOR V-IV REGION (B17). Length = 134	gi|37910	1	462	91	93	HWAEH57
454	HHBHJ76R	presenilin I-463 [Homo sapiens] >pir|S63683|S63683 presenilin I-463 - human Length = 463	gi|1244638	1	303	98	98	HHBHJ76
455	HBJFA18R	prosomal P27K protein [Homo sapiens] >gnl|PID|d1002062 proteasome subunit R-IOTA [Rattus sp.] >pir|S30274|S30274 multicatalytic endopeptidase complex (EC 3.4.99.46) iota chain - human >pir|JX0230|JX0230 multicatalytic endopeptidase complex (EC 3.4.99.46)	gi|35682	178	402	79	83	HBJFA18
456	HCRNF16R	protein kinase [Homo sapiens] >sp|P51956|NEK3_HUMAN SERINE/THREONINE-PROTEIN KINASE NEK3 (EC 2.7.1.-) (NIMA-RELATED PROTEIN KINASE 3) (HSPK 36) (FRAGMENT). Length = 459	gi|479173	336	473	73	79	HCRNF16

457	HAHEK76R	putative surface glycoprotein [Homo sapiens] >sp|P53801|C211_HUMAN PUTATIVE SURFACE GLYCOPROTEIN C21ORF1 PRECURSOR (C21ORF3). Length = 180	gnl|PID|e188111	33	440	83	86	HAHEK76
458	HEOPT38R	renin-binding protein [Homo sapiens] >gi|1302662 renin-binding protein [Homo sapiens] >pir|JX0188|JX0188 renin-binding protein - human Length = 417	gnl|PID|d1001551	2	316	100	100	HEOPT38
459	HOSCG81R	ribonucleoprotein La [Homo sapiens] >sp|Q15367|Q15367 RIBONUCLEOPROTEIN (LA) (FRAGMENT). >gi|338496 SS-B/La protein [Homo sapiens] {SUB 121-171} Length = 355	gi|337457	1	297	96	96	HOSCG81
460	HTFMD43R	ribosomal protein L39 [Homo sapiens] >gnl|PID|d1012131 ribosomal protein L39 [Homo sapiens] >gi|575382 ribosomal protein L39 [Rattus norvegicus] >pir|JC4229|R6RT39 ribosomal protein L39 - rat >pir|G02654|G02654 ribosomal protein L39 - human Length = 51	gi|1373419	3	242	100	100	HTFMD43
461	HDTGQ68R	ribosomal protein L7a large subunit [Homo sapiens] >gi|34203 L7a protein [Homo sapiens] >gi|35512 PLA-X polypeptide [Homo sapiens] >gi|36647 ribosomal protein L7a [Homo sapiens] >gi|56956 ribosomal protein L7a (AA 1-266) [Rattus rattus] >pir|S19717|R5HU7A	gi|337495	43	291	100	100	HDTGQ68

462	H2LAR73R	ribosomal protein S15a [Rattus norvegicus] >pir|JC2234|JC2234 ribosomal protein S15a - rat Length = 130	gi|495273	23	505	100	100	H2LAR73
463	HAMFM26R	ribosomal protein S6 kinase 1 [Homo sapiens] >pir|I51901|I51901 ribosomal protein S6 kinase 2 - human >sp|Q15418|KS61_HUMAN RIBOSOMAL PROTEIN S6 KINASE II ALPHA 1 (EC 2.7.1.-) (S6KII-ALPHA 1) (P90-RSK 1) (RIBOSOMAL S6 KINASE 1) (RSK1) (PP90RSK1). Length =	gi|292457	3	458	97	97	HAMFM26
464	HBMTM61R	Rieske Fe-S protein [Homo sapiens] Length = 274	gi|488299	1	219	53	55	HBMTM61
465	HWHPK71R	RIP [Homo sapiens] >pir|I38992|I38992 receptor interacting protein RIP - human (fragment) Length = 372	gi|829617	198	320	56	64	HWHPK71
466	HWBBJ39R	Sec23 protein [Homo sapiens] Length = 767	gnl|PID|e236014	2	127	81	84	HWBBJ39
467	HSLJJ36R	selenium donor protein [Homo sapiens] Length = 383	gi|1000284	2	319	96	98	HSLJJ36
468	HSODD94R	selenoprotein P [Homo sapiens] Length = 381	gnl|PID|e1192260	2	232	61	70	HSODD94
469	HMIAG25R	serine kinase [Homo sapiens] >pir|S45337|S45337 serine protein kinase SRPK1 - human >sp|Q12890|Q12890 SERINE KINASE. Length = 655	gi|507213	1	330	82	82	HMIAG25
470	HWLEM94R	serine protease [Homo sapiens] Length = 492	gi|2507613	2	304	78	82	HWLEM94

471	HCNDW17R	Sm protein G [Homo sapiens] >pir|S55054|S55054 Sm protein G - human >sp|Q15357|Q15357 SM PROTEIN G. Length = 76	gi|806566	1	240	100	100	HCNDW17
472	HWLEY08R	SNAP23A protein [Homo sapiens] >gnl|PID|e1331767 (AJ011915) synaptosome associated protein of 23 kilodaltons, isoform A [Homo sapiens] >pir|JC5296|JC5296 vesicle-membrane fusion protein SNAP-23A - human >sp|O00161|O00161 VESICLE-MEMBRANE FUSION PROTEIN SN	gnl|PID|e290695	222	608	97	97	HWLEY08
473	HULFN68R	sorcin CP-22 [Homo sapiens] >gi|459836 sorcin [Homo sapiens] >pir|S52094|S52094 sorcin - human >gi|2772536 (AC003991) calcium binding protein amplified in mutlidrug-resistant cells [Homo sapiens] {SUB 1-68} Length = 198	gi|338482	2	409	88	91	HULFN68
474	HMEJD77R	SRp30c [Homo sapiens] >gnl|PID|e1248292 (AL021546) pre-mRNA splicing factor SRp30c [Homo sapiens] >gi|4099429 splicing factor SRp30c [Homo sapiens] >pir|S59075|S59075 splicing factor SRp30c - human >sp|G4099429|G4099429 SPLICING FACTOR SRP30C. Length = 22	gi|1049078	3	263	46	48	HMEJD77
475	HS2AD15R	stimulator of TAR RNA binding [Homo sapiens] Length = 539	gi|1200184	1	336	87	88	HS2AD15

476	HTEJJ32R	STM-7 [Homo sapiens] >sp|Q92749|Q92749 TYPE I PHOSPHATIDYLINOSITOL-4-PHOSPHATE 5-KINASE BETA (EC 2.7.1.68) (STM-7 PROTEIN). >gi|1743883 type I phosphatidylinositol-4-phosphate 5-kinase beta [Homo sapiens] {SUB 112-502} >gi|1743879 type I phosphatidylinosi	gnl|PID|e206448	3	341	100	100	HTEJJ32
477	HETIF46R	sulfate transporter [Homo sapiens] >sp|P50443|DTD_HUMAN SULFATE TRANSPORTER (DIASTROPHIC DYSPLASIA PROTEIN). Length = 739	gi|549988	1	228	71	71	HETIF46
478	H2CBS58R	thrombospondin 2 [Homo sapiens] >pir|A47379|TSHUP2 thrombospondin 2 precursor - human Length = 1172	gi|307506	3	455	96	97	H2CBS58
479	H2LAB77R	thymosin beta-4 precursor [Rattus norvegicus] >pir|I52084|I52084 thymosin beta-4 precursor - rat (fragment) >gi|339689 thymosin beta-4 [Homo sapiens] {SUB 13-56} >pir|A01521|TNBOB4 thymosin beta-4 - bovine {SUB 14-56} >gi|825683 open reading frame [Homo s	gi|207318	98	265	100	100	H2LAB77
480	HODAJ23R	tissue-specific secretory protein [unidentified] >gi|32051 HE4 protein [Homo sapiens] >pir|S25454|S25454 HE4 protein - human >sp|Q14508|EP4_HUMAN MAJOR EPIDIDYMIS-SPECIFIC PROTEIN E4 PRECURSOR (HE4) (EPIDIDYMAL SECRETORY PROTEIN E4). Length =	gi|583141	2	223	62	62	HODAJ23

125

481	HWAFP88R	TRANSCRIPTION FACTOR BTF3 (RNA POLYMERASE B TRANSCRIPTION FACTOR 3). Length = 204	sp|Q64152|BTF3_MOUSE	85	471	92	93	HWAFP88
482	HDTHI51R	transcription factor-like protein 4 - human Length = 298	pir|JC5333|JC5333	2	565	82	86	HDTHI51
483	HWMEB67R	tryptase-III [Homo sapiens] >sp|Q15664|Q15664 TRYPTASE-III (FRAGMENT). Length = 267	gi|339985	21	218	92	92	HWMEB67
484	HTXOU93R	tumor susceptibility protein [Homo sapiens] >sp|Q99816|Q99816 TUMOR SUSCEPTIBILITY PROTEIN. Length = 390	gi|3184258	2	439	100	100	HTXOU93
485	HANKB37R	ubiquitin [Plasmodium falciparum] >sp|Q26029|Q26029 UBIQUITIN. Length = 77	gi|552237	11	115	70	73	HANKB37
486	HWLHN38R	ubiquitin-conjugating enzyme [Mus musculus] >sp|O88738|O88738 UBIQUITIN-CONJUGATING ENZYME. Length = 4845	gnl|PID|e1311091	129	347	77	83	HWLHN38

487	HOSDZ35R	UDP-GalNAc:polypeptide N-acetylgalactosaminyltransferas [Homo sapiens] >sp|Q14435|Q14435 POLYPEPTIDE N-ACETYLGALACTOSAMINYLTRANSFERASE (EC 2.4.1.41) (PROTEIN-UDP ACETYLGALACTOSAMINYLTRANSFERASE) (UDP-GALNAC:POLYPEPTIDE, N-ACETYLGALACTOSAMINYLTRANSFERASE)	gnl|PID|e209711	2	286	85	85	HOSDZ35
488	HKMAA52R	UDP-glucuronosyltransferase [Homo sapiens] >pir|A31340|A31340 glucuronosyltransferase (EC 2.4.1.17) UGT1A1 precursor - human >sp|G245274|G245274 PHENOL TRANSFERASE=UGT1F PRODUCT. {SUB 1-286} >gi|2645491 (AF014112) phenol UDP-glucuronosyltransferase [Homo	gi|624725	3	284	98	98	HKMAA52
489	H2LAB37R			93	290			H2LAB37
490	H2LAP46R			206	568			H2LAP46
491	H6BSE61R			67	369			H6BSE61
492	H6EEE76R			149	277			H6EEE76
493	H6EEV26R			2	88			H6EEV26
494	HABAF88R			40	216			HABAF88
495	HABGD41R			1	147			HABGD41
496	HACBS75R			5	187			HACBS75
497	HACCA48R			5	91			HACCA48
498	HACCS19R			3	341			HACCS19
499	HADAB25R			1	261			HADAB25
500	HAGGL96R			3	347			HAGGL96

501	HAGGT37R	3	113	HAGGT37
502	HAHDR66R	27	347	HAHDR66
503	HAJCC53R	164	418	HAJCC53
504	HAJCL80R	3	122	HAJCL80
505	HANKF43R	372	566	HANKF43
506	HAPCM11R	69	152	HAPCM11
507	HAPNT66R	1	66	HAPNT66
508	HAQAG47R	2	148	HAQAG47
509	HAQBW58R	3	260	HAQBW58
510	HAQMH45R	91	363	HAQMH45
511	HAQMI94R	1	183	HAQMI94
512	HARNC74R	84	272	HARNC74
513	HATBA87R	98	202	HATBA87
514	HATBG77R	174	392	HATBG77
515	HBAGQ79R	1	231	HBAGQ79
516	HBCAN64R	2	82	HBCAN64
517	HBGCA44R	1	123	HBGCA44
518	HBGFX27R	3	281	HBGFX27
519	HBGMU38R	40	429	HBGMU38
520	HBJBO10R	1	93	HBJBO10
521	HBJCC53R	2	106	HBJCC53
522	HBJED55R	1	252	HBJED55
523	HBJGR39R	2	106	HBJGR39
524	HBJLU30R	39	344	HBJLU30
525	HBKEC78R	93	245	HBKEC78
526	HBMST81R	1	192	HBMST81
527	HBMTJ51R	150	323	HBMTJ51
528	HBMWF72R	1	111	HBMWF72
529	HBWBD78R	2	226	HBWBD78
530	HBXCU02R	2	79	HBXCU02
531	HCDAK65R	1	138	HCDAK65

532	HCDBM08R	130	339	HCDBM08
533	HCDCP10R	72	206	HCDCP10
534	HCDDQ63R	3	116	HCDDQ63
535	HCEEH05R	204	380	HCEEH05
536	HCEIQ92R	1	90	HCEIQ92
537	HCFCD01R	28	228	HCFCD01
538	HCFCR43R	64	360	HCFCR43
539	HCFLT83R	3	104	HCFLT83
540	HCHAO92R	193	342	HCHAO92
541	HCHOH49R	183	344	HCHOH49
542	HCHPG05R	365	616	HCHPG05
543	HCIAD24R	98	301	HCIAD24
544	HCNCA90R	380	532	HCNCA90
545	HCNCN80R	120	353	HCNCN80
546	HCNCY51R	184	267	HCNCY51
547	HCNCY63R	1	81	HCNCY63
548	HCNDO71R	1	213	HCNDO71
549	HCNDV83R	64	303	HCNDV83
550	HCNUB26R	119	289	HCNUB26
551	HCQBN22R	2	94	HCQBN22
552	HCQCL27R	116	235	HCQCL27
553	HCQCL48R	57	251	HCQCL48
554	HCQCL96R	287	430	HCQCL96
555	HCQDC74R	145	360	HCQDC74
556	HCQDH94R	20	76	HCQDH94
557	HCQDJ42R	149	388	HCQDJ42
558	HCRMD77R	3	185	HCRMD77
559	HCRME02R	3	293	HCRME02
560	HCRMX88R	3	284	HCRMX88
561	HCRNA70R	40	204	HCRNA70
562	HCRNP66R	3	431	HCRNP66

563	HCRNX32R	2	196	HCRNX32
564	HCROH25R	3	128	HCROH25
565	HCROJ05R	66	170	HCROJ05
566	HCROJ68R	3	239	HCROJ68
567	HCROK68R	2	208	HCROK68
568	HCROK94R	1	210	HCROK94
569	HCROM30R	3	365	HCROM30
570	HCROQ34R	29	136	HCROQ34
571	HCROQ54R	3	98	HCROQ54
572	HCROZ66R	239	427	HCROZ66
573	HCRPC61R	3	194	HCRPC61
574	HCRPG28R	95	229	HCRPG28
575	HCRPL80R	59	235	HCRPL80
576	HCRPN52R	3	191	HCRPN52
577	HCRPS40R	208	321	HCRPS40
578	HCRPV74R	179	409	HCRPV74
579	HCRQC89R	2	85	HCRQC89
580	HCWDS78R	322	558	HCWDS78
581	HDCAA21R	1	120	HDCAA21
582	HDDAA85R	139	258	HDDAA85
583	HDPGO03R	110	352	HDPGO03
584	HDPLB08R	142	360	HDPLB08
585	HDQDB15R	220	417	HDQDB15
586	HDQEX80R	274	492	HDQEX80
587	HDRMI91R	3	116	HDRMI91
588	HDTJO85R	36	197	HDTJO85
589	HDTMJ22R	192	608	HDTMJ22
590	HE6CS28R	40	213	HE6CS28
591	HE6DJ45R	2	64	HE6DJ45
592	HE7TJ40R	62	268	HE7TJ40
593	HE9FH12R	182	307	HE9FH12

594	HE9HJ57R	3	74	HE9HJ57
595	HE9QH08R	360	596	HE9QH08
596	HE9TC50R	198	425	HE9TC50
597	HEAAL59R	1	150	HEAAL59
598	HEGAR32R	448	675	HEGAR32
599	HEGAR85R	361	534	HEGAR85
600	HELFE05R	32	187	HELFE05
601	HEMFI88R	29	343	HEMFI88
602	HEMFR18R	83	397	HEMFR18
603	HEONL43R	2	76	HEONL43
604	HESAC53R	3	116	HESAC53
605	HETJB05R	1	138	HETJB05
606	HETJC36R	1	102	HETJC36
607	HFADM62R	1	78	HFADM62
608	HFATE31R	2	361	HFATE31
609	HFATZ30R	3	152	HFATZ30
610	HFCEL77R	3	278	HFCEL77
611	HFEBN43R	174	491	HFEBN43
612	HFGAF10R	272	469	HFGAF10
613	HFIEC01R	1	144	HFIEC01
614	HFIIR75R	317	427	HFIIR75
615	HFIUB90R	2	124	HFIUB90
616	HFIUM71R	37	159	HFIUM71
617	HFOXL53R	1	117	HFOXL53
618	HFPBO66R	196	408	HFPBO66
619	HFTBI57R	47	220	HFTBI57
620	HFTCC22R	1	126	HFTCC22
621	HFXGX46R	1	114	HFXGX46
622	HGAME72R	2	199	HGAME72
623	HGBCS53R	142	279	HGBCS53
624	HGBHP81R	87	221	HGBHP81

625	HGCOX03R	323	511	HGCOX03
626	HHBES92R	349	483	HHBES92
627	HHBEW72R	13	219	HHBEW72
628	HHERT59R	2	88	HHERT59
629	HHMMD64R	31	252	HHMMD64
630	HHSGT13R	428	619	HHSGT13
631	HISED82R	1	126	HISED82
632	HJMAH76R	2	253	HJMAH76
633	HJMAN56R	1	180	HJMAN56
634	HJMAO54R	1	291	HJMAO54
635	HKDAD56R	2	109	HKDAD56
636	HKLSD93R	89	298	HKLSD93
637	HLMFH16R	1	447	HLMFH16
638	HLQBD52R	1	195	HLQBD52
639	HLQCQ73R	3	350	HLQCQ73
640	HLQEF47R	348	503	HLQEF47
641	HLQFM50R	136	291	HLQFM50
642	HLQFY61R	411	575	HLQFY61
643	HLQGA76R	210	404	HLQGA76
644	HLQGE53R	1	66	HLQGE53
645	HLTEV09R	210	371	HLTEV09
646	HLXNE63R	142	258	HLXNE63
647	HLXTF64R	2	136	HLXTF64
648	HMACF85R	23	430	HMACF85
649	HMAIA15R	108	452	HMAIA15
650	HMCHZ07R	247	402	HMCHZ07
651	HMCIS54R	84	242	HMCIS54
652	HMSFW88R	1	69	HMSFW88
653	HMSMW71R	290	514	HMSMW71
654	HNHMR05R	77	598	HNHMR05
655	HNJBB78R	91	282	HNJBB78

656	HNTMA96R	3	362	HNTMA96
657	HNTRL32R	130	291	HNTRL32
658	HNTST76R	2	397	HNTST76
659	HOCNC55R	67	156	HOCNC55
660	HOCND06R	147	275	HOCND06
661	HOCND49R	133	273	HOCND49
662	HODEH30R	2	154	HODEH30
663	HODFA26R	263	550	HODFA26
664	HODHL89R	106	279	HODHL89
665	HOEJM67R	2	364	HOEJM67
666	HOGBN48R	147	380	HOGBN48
667	HOHCX95R	2	364	HOHCX95
668	HORBP43R	3	365	HORBP43
669	HOUHN53R	235	345	HOUHN53
670	HOUIE10R	72	254	HOUIE10
671	HPBEE63R	107	211	HPBEE63
672	HPEBO20R	1	237	HPEBO20
673	HPJBE91R	1	312	HPJBE91
674	HPTRW82R	32	133	HPTRW82
675	HPWDC51R	33	272	HPWDC51
676	HPWDK52R	1	330	HPWDK52
677	HRDBJ82R	2	334	HRDBJ82
678	HRODH93R	2	121	HRODH93
679	HS2AD53R	1	120	HS2AD53
680	HSATR92R	3	203	HSATR92
681	HSDZG83R	5	136	HSDZG83
682	HSICQ60R	2	118	HSICQ60
683	HSIFA64R	3	449	HSIFA64
684	HSKNN36R	108	527	HSKNN36
685	HSKYE52R	2	124	HSKYE52
686	HSLJA55R	2	169	HSLJA55

687	HSODA95R	2	169	HSODA95
688	HSPBS19R	1	372	HSPBS19
689	HSSGK43R	3	155	HSSGK43
690	HSXFJ91R	3	242	HSXFJ91
691	HTEMB57R	168	410	HTEMB57
692	HTGBR05R	37	138	HTGBR05
693	HTLGA72R	3	455	HTLGA72
694	HTLIX61R	1	102	HTLIX61
695	HTNTF25R	307	426	HTNTF25
696	HTWCP79R	91	180	HTWCP79
697	HTXFA64R	3	263	HTXFA64
698	HUSJF91R	218	412	HUSJF91
699	HUSJN48R	259	462	HUSJN48
700	HUSJX68R	98	493	HUSJX68
701	HUSZN23R	36	131	HUSZN23
702	HUTSD20R	104	256	HUTSD20
703	HWACH10R	66	275	HWACH10
704	HWAFI63R	3	272	HWAFI63
705	HWAGZ89R	176	385	HWAGZ89
706	HWBAQ20R	1	177	HWBAQ20
707	HWHHM83R	2	298	HWHHM83
708	HWLAC24R	11	133	HWLAC24
709	HWLAC81R	64	360	HWLAC81
710	HWLBF27R	3	149	HWLBF27
711	HWLBS90R	195	347	HWLBS90
712	HWLCU10R	55	120	HWLCU10
713	HWLEH13R	2	379	HWLEH13
714	HWLEJ67R	375	527	HWLEJ67
715	HWLEM49R	244	354	HWLEM49
716	HWLFP27R	2	79	HWLFP27
717	HWLGG20R	92	208	HWLGG20

718	HWLGK22R	209	373	HWLGK22
719	HWLGM21R	244	354	HWLGM21
720	HWLGP37R	8	181	HWLGP37
721	HWLGS46R	40	324	HWLGS46
722	HWLGU40R	2	202	HWLGU40
723	HWLGX65R	3	230	HWLGX65
724	HWLHD09R	2	310	HWLHD09
725	HWLHD50R	3	98	HWLHD50
726	HWLHM40R	2	208	HWLHM40
727	HWLHW89R	56	382	HWLHW89
728	HWLID17R	64	276	HWLID17
729	HWLIM20R	3	158	HWLIM20
730	HWLJA26R	34	135	HWLJA26
731	HWLJA28R	1	108	HWLJA28
732	HWLJG57R	240	404	HWLJG57
733	HWLJL19R	119	292	HWLJL19
734	HWLJP50R	1	147	HWLJP50
735	HWLKG82R	1	360	HWLKG82
736	HWLKG95R	1	300	HWLKG95
737	HWLKI53R	1	144	HWLKI53
738	HWLKM09R	2	100	HWLKM09
739	HWLKM86R	44	226	HWLKM86
740	HWLKM95R	2	184	HWLKM95
741	HWLKU25R	3	137	HWLKU25
742	HWLQS83R	1	117	HWLQS83
743	HWLQU65R	361	558	HWLQU65
744	HWLRL59R	1	225	HWLRL59
745	HWLRP86R	2	253	HWLRP86
746	HWLRQ49R	3	158	HWLRQ49
747	HWLUF60R	84	218	HWLUF60
748	HWLUI37R	51	263	HWLUI37

749	HWLUR41R			33	155			HWLUR41
750	HWLVD60R			1	174			HWLVD60
751	HWLVV50R			1	72			HWLVV50
752	HWMAN61R			3	107			HWMAN61
753	HWMEB47R			87	185			HWMEB47
754	HWMEH13R			2	256			HWMEH13
755	HWMEH26R			168	341			HWMEH26
756	HWMEL50R			131	400			HWMEL50
757	HWMFB31R			100	285			HWMFB31
758	HWMFL66R			61	153			HWMFL66
759	HWMFO93R			2	79			HWMFO93
760	HWMFP01R			120	284			HWMFP01
761	HZAAD81R			1	144			HZAAD81
762	HWLHN70R			2	160			HWLHN70
763	HFIXK57R	URF 3 (NADH dehydrogenase subunit) [Homo sapiens] >gi|506832 protein 3 [Homo sapiens] >pir|A00422|DNHUN3 NADH dehydrogenase (ubiquinone) (EC 1.6.5.3) chain 3 - human mitochondrion (SGC1) >sp|P03897|NU3M_HUMAN NADH-UBIQUINONE OXIDOREDUCTASE CHAIN 3 (EC 1.6	gi|13011	2	211	90	97	HFIXK57
764	HMAFE48R	URF 3 (NADH dehydrogenase subunit) [Homo sapiens] >gi|506832 protein 3 [Homo sapiens] >pir|A00422|DNHUN3 NADH dehydrogenase (ubiquinone) (EC 1.6.5.3) chain 3 - human mitochondrion (SGC1) >sp|P03897|NU3M_HUMAN NADH-UBIQUINONE OXIDOREDUCTASE CHAIN 3 (EC 1.6	gi|13011	47	205	90	100	HMAFE48

765	HRODJ88R	URF 3 (NADH dehydrogenase subunit) [Homo sapiens] >gi|506832 protein 3 [Homo sapiens] >pir|A00422|DNHUN3 NADH dehydrogenase (ubiquinone) (EC 1.6.5.3) chain 3 - human mitochondrion (SGC1) >sp|P03897|NU3M_HUMAN NADH-UBIQUINONE OXIDOREDUCTASE CHAIN 3 (EC 1.6	gi|13011	55	213	83	94	HRODJ88
766	HWLAR31R	URF 3 (NADH dehydrogenase subunit) [Homo sapiens] >gi|506832 protein 3 [Homo sapiens] >pir|A00422|DNHUN3 NADH dehydrogenase (ubiquinone) (EC 1.6.5.3) chain 3 - human mitochondrion (SGC1) >sp|P03897|NU3M_HUMAN NADH-UBIQUINONE OXIDOREDUCTASE CHAIN 3 (EC 1.6	gi|13011	56	214	91	100	HWLAR31
767	HNHLH26R	v-SNARE [Cricetulus griseus] >sp|O08522|O08522 V-SNARE. Length = 250	gi|1912453	73	243	64	76	HNHLH26
768	H2LAU24R	weakly similar to gastrula zinc finger protein [Caenorhabditis elegans] >sp|Q09998|Q09998 PUTATIVE 55.5 KD ZINC FINGER PROTEIN R144.3 IN CHROMOSOME III. Length = 492	gi|746495	78	488	45	60	H2LAU24
769	HATDR94R	X box binding protein-1 [Homo sapiens] >pir|A36299|A36299 transcription factor hXBP-1 - human Length = 260	gi|306893	2	367	95	100	HATDR94
770	HWLLI85R	X-linked deafness dystonia protein [Homo sapiens] >sp|O60220|O60220 X-LINKED DEAFNESS DYSTONIA PROTEIN. Length = 97	gi|3123843	410	580	60	80	HWLLI85

771	HBHMF67R	XP-C repair complementing protein (p58/HHR23B) [Homo sapiens] >pir|S44346|S44346 RAD23 protein homolog - human Length = 409	gnl|PID|d1005181	3	191	96	96	HBHMF67
772	HSYCH41R	yeast methionyl-tRNA synthetase homolog [Homo sapiens] >pir|JC5224|JC5224 methionine--tRNA ligase (EC 6.1.1.10) - human >gi|804996 mitoxantrone-resistance associated gene [Homo sapiens] {SUB 423-900} Length = 900	gnl|PID|e218477	2	373	90	90	HSYCH41
773	HWLJR53R	zinc finger protein PZF [Mus musculus] >pir|I48724|I48724 zinc finger protein PZF - mouse >sp|Q62511|Q62511 ZINC FINGER PROTEIN PZF. Length = 455	gi|453376	1	552	81	83	HWLJR53

The first column of Table 1 shows the "SEQ ID NO:" for each of the 773 colon cancer antigen polynucleotide sequences of the invention.

The second column in Table 1, provides a unique "Sequence/Contig ID" identification for each colon and/or colon cancer associated sequence. The third column in Table 1. "Gene Name." provides a putative identification of the gene based on the sequence similarity of its translation product to an amino acid sequence found in a publicly accessible gene database, such as GenBank (NCBI). The great majority of the cDNA sequences reported in Table 1 are unrelated to any sequences previously described in the literature. The fourth column, in Table 1, "Overlap," provides the database accession no. for the database sequence having similarity. The fifth and sixth columns in Table 1 provide the location (nucleotide position nos. within the contig), "Start" and "End", in the polynucleotide sequence "SEQ ID NO:X" that delineate the preferred ORF shown in the sequence listing as SEQ ID NO:Y. In one embodiment, the invention provides a protein comprising, or alternatively consisting of, a polypeptide encoded by the portion of SEQ ID NO:X delineated by the nucleotide position nos. "Start" and "End". Also provided are polynucleotides encoding such proteins and the complementary strand thereto. The seventh and eighth columns provide the "% Identity" (percent identity) and "% Similarity" (percent similarity) observed between the aligned sequence segments of the translation product of SEQ ID NO:X and the database sequence.

The ninth column of Table 1 provides a unique "Clone ID" for a clone related to each contig sequence. This clone ID references the cDNA clone which contains at least the 5' most sequence of the assembled contig and at least a portion of SEQ ID NO:X was determined by directly sequencing the referenced clone. The reference clone may have more sequence than described in the sequence listing or the clone may have less. In the vast majority of cases, however, the clone is believed to encode a full-length polypeptide. In the case where a clone is not full-length, a full-length cDNA can be obtained by methods described elsewhere herein.

Table 3 indicates public ESTs, of which at least one, two, three, four, five, ten, or more of any one or more of these public ESTs are optionally excluded from the invention.

SEQ ID NO:X (where X may be any of the polynucleotide sequences disclosed in the sequence listing as SEQ ID NO:1 through SEQ ID NO:773) and the translated SEQ ID NO:Y (where Y may be any of the polypeptide sequences disclosed in the sequence listing as SEQ ID NO:774 through SEQ ID NO:1546) are sufficiently accurate and otherwise suitable for a

variety of uses well known in the art and described further below. For instance, SEQ ID NO:X has uses including, but not limited to, in designing nucleic acid hybridization probes that will detect nucleic acid sequences contained in SEQ ID NO:X or the related cDNA clone contained in a library deposited with the ATCC. These probes will also hybridize to nucleic acid molecules in biological samples, thereby enabling immediate applications in chromosome mapping, linkage analysis, tissue identification and/or typing, and a variety of forensic and diagnostic methods of the invention. Similarly, polypeptides identified from SEQ ID NO:Y have uses that include, but are not limited to, generating antibodies which bind specifically to the colon cancer antigen polypeptides, or fragments thereof, and/or to the colon cancer antigen polypeptides encoded by the cDNA clones identified in Table 1.

Nevertheless, DNA sequences generated by sequencing reactions can contain sequencing errors. The errors exist as misidentified nucleotides, or as insertions or deletions of nucleotides in the generated DNA sequence. The erroneously inserted or deleted nucleotides cause frame shifts in the reading frames of the predicted amino acid sequence. In these cases, the predicted amino acid sequence diverges from the actual amino acid sequence, even though the generated DNA sequence may be greater than 99.9% identical to the actual DNA sequence (for example, one base insertion or deletion in an open reading frame of over 1000 bases).

Accordingly, for those applications requiring precision in the nucleotide sequence or the amino acid sequence, the present invention provides not only the generated nucleotide sequence identified as SEQ ID NO:X, the predicted translated amino acid sequence identified as SEQ ID NO:Y, but also a sample of plasmid DNA containing the related cDNA clone (deposited with the ATCC, as set forth in Table 1). The nucleotide sequence of each deposited clone can readily be determined by sequencing the deposited clone in accordance with known methods. Further, techniques known in the art can be used to verify the nucleotide sequences of SEQ ID NO:X.

The predicted amino acid sequence can then be verified from such deposits. Moreover, the amino acid sequence of the protein encoded by a particular clone can also be directly determined by peptide sequencing or by expressing the protein in a suitable host cell containing the deposited human cDNA, collecting the protein, and determining its sequence.

The present invention also relates to vectors or plasmids which include such DNA sequences, as well as the use of the DNA sequences. The material deposited with the ATCC on:

Table 2

ATCC Deposits	Deposit Date	ATCC Designation Number
LP01, LP02, LP03, LP04, LP05, LP06, LP07, LP08, LP09, LP10, LP11,	May-20-97	209059, 209060, 209061, 209062, 209063, 209064, 209065, 209066, 209067, 209068, 209069
LP12	Jan-12-98	209579
LP13	Jan-12-98	209578
LP14	Jul-16-98	203067
LP15	Jul-16-98	203068
LP16	Feb-1-99	203609
LP17	Feb-1-99	203610
LP20	Nov-17-98	203485
LP21	Jun-18-99	PTA-252
LP22	Jun-18-99	PTA-253
LP23	Dec-22-99	PTA-1081

each is a mixture of cDNA clones derived from a variety of human tissue and cloned in either a plasmid vector or a phage vector, as shown in Table 5. These deposits are referred to as "the deposits" herein. The tissues from which the clones were derived are listed in Table 5, and the vector in which the cDNA is contained is also indicated in Table 5. The deposited material includes the cDNA clones which were partially sequenced and are related to the SEQ ID NO:X described in Table 1 (column 9). Thus, a clone which is isolatable from the ATCC Deposits by use of a sequence listed as SEQ ID NO:X may include the entire coding region of a human gene or in other cases such clone may include a substantial portion of the coding region of a human gene. Although the sequence listing lists only a portion of the DNA sequence in a clone included in the ATCC Deposits, it is well within the ability of one skilled in the art to complete the sequence of the DNA included in a clone isolatable from the

ATCC Deposits by use of a sequence (or portion thereof) listed in Table 1 by procedures hereinafter further described, and others apparent to those skilled in the art.

Also provided in Table 5 is the name of the vector which contains the cDNA clone. Each vector is routinely used in the art. The following additional information is provided for convenience.

Vectors Lambda Zap (U.S. Patent Nos. 5,128,256 and 5,286,636), Uni-Zap XR (U.S. Patent Nos. 5,128, 256 and 5,286,636), Zap Express (U.S. Patent Nos. 5,128,256 and 5,286,636), pBluescript (pBS) (Short, J. M. et al., *Nucleic Acids Res. 16*:7583-7600 (1988); Alting-Mees, M. A. and Short, J. M., *Nucleic Acids Res. 17*:9494 (1989)) and pBK (Alting-Mees, M. A. et al., *Strategies 5*:58-61 (1992)) are commercially available from Stratagene Cloning Systems, Inc., 11011 N. Torrey Pines Road. La Jolla, CA, 92037. pBS contains an ampicillin resistance gene and pBK contains a neomycin resistance gene. Phagemid pBS may be excised from the Lambda Zap and Uni-Zap XR vectors, and phagemid pBK may be excised from the Zap Express vector. Both phagemids may be transformed into *E. coli* strain XL-1 Blue, also available from Stratagene.

Vectors pSport1, pCMVSport 1.0, pCMVSport 2.0 and pCMVSport 3.0, were obtained from Life Technologies, Inc., P. O. Box 6009, Gaithersburg, MD 20897. All Sport vectors contain an ampicillin resistance gene and may be transformed into *E. coli* strain DH10B, also available from Life Technologies. See, for instance, Gruber, C. E., et al., *Focus 15*:59 (1993). Vector lafmid BA (Bento Soares, Columbia University, New York, NY) contains an ampicillin resistance gene and can be transformed into *E. coli* strain XL-1 Blue. Vector pCR®2.1, which is available from Invitrogen, 1600 Faraday Avenue, Carlsbad, CA 92008, contains an ampicillin resistance gene and may be transformed into *E. coli* strain DH10B, available from Life Technologies. See, for instance, Clark, J. M., *Nuc. Acids Res. 16*:9677-9686 (1988) and Mead, D. *et al., Bio/Technology 9*: (1991).

The present invention also relates to the genes corresponding to SEQ ID NO:X, SEQ ID NO:Y, and/or the cDNA contained in a deposited cDNA clone. The corresponding gene can be isolated in accordance with known methods using the sequence information disclosed herein. Such methods include, but are not limited to, preparing probes or primers from the disclosed sequence and identifying or amplifying the corresponding gene from appropriate sources of genomic material.

Also provided in the present invention are allelic variants, orthologs, and/or species homologs. Procedures known in the art can be used to obtain full-length genes, allelic variants, splice variants, full-length coding portions, orthologs, and/or species homologs of genes corresponding to SEQ ID NO:X, SEQ ID NO:Y, and/or the cDNA contained in the related cDNA clone in the deposit, using information from the sequences disclosed herein or the clones deposited with the ATCC. For example, allelic variants and/or species homologs may be isolated and identified by making suitable probes or primers from the sequences provided herein and screening a suitable nucleic acid source for allelic variants and/or the desired homologue.

The present invention provides a polynucleotide comprising, or alternatively consisting of, the nucleic acid sequence of SEQ ID NO:X, and/or the related cDNA clone (See, e.g., columns 1 and 9 of Table 1). The present invention also provides a polypeptide comprising, or alternatively, consisting of, the polypeptide sequence of SEQ ID NO:Y, a polypeptide encoded by SEQ ID NO:X, and/or a polypeptide encoded by the cDNA in the related cDNA clone contained in a deposited library. Polynucleotides encoding a polypeptide comprising, or alternatively consisting of, the polypeptide sequence of SEQ ID NO:Y, a polypeptide encoded by SEQ ID NO:X, and/or a polypeptide encoded by the the cDNA in the related cDNA clone contained in a deposited library, are also encompassed by the invention. The present invention further encompasses a polynucleotide comprising, or alternatively consisting of, the complement of the nucleic acid sequence of SEQ ID NO:X, and/or the complement of the coding strand of the related cDNA clone contained in a deposited library.

Many polynucleotide sequences, such as EST sequences, are publicly available and accessible through sequence databases and may have been publicly available prior to conception of the present invention. Preferably, such related polynucleotides are specifically excluded from the scope of the present invention. To list every related sequence would unduly burden the disclosure of this application. Accordingly, for each "Contig Id" listed in the first column of Table 3, preferably excluded are one or more polynucleotides comprising a nucleotide sequence described in the second column of Table 3 by the general formula of a-b, each of which are uniquely defined for the SEQ ID NO:X corresponding to that Contig Id in Table 1. Additionally, specific embodiments are directed to polynucleotide sequences excluding at least one, two, three, four, five, ten, or more of the specific polynucleotide sequences referenced by the Genbank Accession No. for each Contig Id which may be

included in column 3 of Table 3. In no way is this listing meant to encompass all of the sequences which may be excluded by the general formula, it is just a representative example.

Table 3.

Sequence/ Contig ID	General formula	Genbank Accession No.
500802	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 619 of SEQ ID NO:1, b is an integer of 15 to 633, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:1, and where b is greater than or equal to a + 14.	
531091	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 281 of SEQ ID NO:2, b is an integer of 15 to 295, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:2, and where b is greater than or equal to a + 14.	
553147	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 428 of SEQ ID NO:3, b is an integer of 15 to 442, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:3, and where b is greater than or equal to a + 14.	
558860	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 740 of SEQ ID NO:4, b is an integer of 15 to 754, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:4, and where b is greater than or equal to a + 14.	
561730	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 379 of SEQ ID NO:5, b is an integer of 15 to 393, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:5, and where b is greater than or equal to a + 14.	
585938	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 525 of SEQ ID NO:6, b is an integer of 15 to 539, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:6, and where b is greater than or equal to a + 14.	
587785	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 790 of SEQ ID	

	NO:7. b is an integer of 15 to 804, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:7, and where b is greater than or equal to a + 14.	
588916	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 706 of SEQ ID NO:8, b is an integer of 15 to 720, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:8, and where b is greater than or equal to a + 14.	
613825	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 526 of SEQ ID NO:9, b is an integer of 15 to 540, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:9, and where b is greater than or equal to a + 14.	
639090	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 547 of SEQ ID NO:10, b is an integer of 15 to 561, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:10, and where b is greater than or equal to a + 14.	
651644	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 379 of SEQ ID NO:11, b is an integer of 15 to 393, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:11, and where b is greater than or equal to a + 14.	
659544	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 308 of SEQ ID NO:12, b is an integer of 15 to 322, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:12, and where b is greater than or equal to a + 14.	
659739	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1893 of SEQ ID NO:13, b is an integer of 15 to 1907, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:13, and where b is greater than or equal to a + 14.	
661057	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1126 of SEQ ID NO:14, b is an integer of 15 to 1140, where both a	

	and b correspond to the positions of nucleotide residues shown in SEQ ID NO:14. and where b is greater than or equal to a + 14.	
661313	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1994 of SEQ ID NO:15. b is an integer of 15 to 2008. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:15. and where b is greater than or equal to a + 14.	
666316	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 357 of SEQ ID NO:16. b is an integer of 15 to 371, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:16. and where b is greater than or equal to a + 14.	
669229	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 749 of SEQ ID NO:17. b is an integer of 15 to 763. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:17. and where b is greater than or equal to a + 14.	
670471	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1912 of SEQ ID NO:18. b is an integer of 15 to 1926, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:18, and where b is greater than or equal to a + 14.	
676611	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2287 of SEQ ID NO:19. b is an integer of 15 to 2301, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:19. and where b is greater than or equal to a + 14.	
691240	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 524 of SEQ ID NO:20. b is an integer of 15 to 538, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:20, and where b is greater than or equal to a + 14.	
702977	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1389 of SEQ ID NO:21. b is an integer of 15 to 1403. where both a and b correspond to the positions of nucleotide	

	residues shown in SEQ ID NO:21. and where b is greater than or equal to a + 14.	
709517	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 464 of SEQ ID NO:22. b is an integer of 15 to 478, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:22. and where b is greater than or equal to a + 14.	
714730	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1238 of SEQ ID NO:23. b is an integer of 15 to 1252, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:23. and where b is greater than or equal to a + 14.	
714834	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1060 of SEQ ID NO:24. b is an integer of 15 to 1074. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:24. and where b is greater than or equal to a + 14.	
715016	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1172 of SEQ ID NO:25. b is an integer of 15 to 1186. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:25. and where b is greater than or equal to a + 14.	
719584	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 874 of SEQ ID NO:26. b is an integer of 15 to 888, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:26, and where b is greater than or equal to a + 14.	
724637	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 775 of SEQ ID NO:27, b is an integer of 15 to 789, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:27, and where b is greater than or equal to a + 14.	
728392	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 833 of SEQ ID NO:28. b is an integer of 15 to 847. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:28. and where b is greater than	

	or equal to a + 14.	
738716	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 652 of SEQ ID NO:29, b is an integer of 15 to 666, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:29, and where b is greater than or equal to a + 14.	
739056	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 503 of SEQ ID NO:30, b is an integer of 15 to 517, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:30, and where b is greater than or equal to a + 14.	
739143	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2661 of SEQ ID NO:31, b is an integer of 15 to 2675, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:31, and where b is greater than or equal to a + 14.	
742329	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 263 of SEQ ID NO:32, b is an integer of 15 to 277, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:32, and where b is greater than or equal to a + 14.	
742557	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 907 of SEQ ID NO:33, b is an integer of 15 to 921, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:33, and where b is greater than or equal to a + 14.	
745481	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1453 of SEQ ID NO:34, b is an integer of 15 to 1467, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:34, and where b is greater than or equal to a + 14.	
746035	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2063 of SEQ ID NO:35, b is an integer of 15 to 2077, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:35, and where b is greater than or equal to a + 14.	

753731	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 370 of SEQ ID NO:36, b is an integer of 15 to 384, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:36, and where b is greater than or equal to a + 14.	
754383	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 454 of SEQ ID NO:37, b is an integer of 15 to 468, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:37, and where b is greater than or equal to a + 14.	
756749	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1081 of SEQ ID NO:38, b is an integer of 15 to 1095, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:38, and where b is greater than or equal to a + 14.	
757980	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1743 of SEQ ID NO:39, b is an integer of 15 to 1757, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:39, and where b is greater than or equal to a + 14.	R38216, R63249, R78721, H01441, H02557, H02640, H86258, H86321, N21599, W16868, W31882, W56228, N90610, AA047227, AA056107, AA058568, AA100609, AA115890
764818	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1931 of SEQ ID NO:40, b is an integer of 15 to 1945, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:40, and where b is greater than or equal to a + 14.	
765140	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 574 of SEQ ID NO:41, b is an integer of 15 to 588, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:41, and where b is greater than or equal to a + 14.	
766893	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1554 of SEQ ID NO:42, b is an integer of 15 to 1568, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:42, and where b is greater than or equal to a + 14.	R69702, R76994, R77002, H01357
771338	Preferably excluded from the present invention are	

	one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1046 of SEQ ID NO:43. b is an integer of 15 to 1060. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:43. and where b is greater than or equal to a + 14.	
771412	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1330 of SEQ ID NO:44. b is an integer of 15 to 1344. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:44. and where b is greater than or equal to a + 14.	
772226	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 878 of SEQ ID NO:45. b is an integer of 15 to 892. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:45. and where b is greater than or equal to a + 14.	
773057	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 482 of SEQ ID NO:46. b is an integer of 15 to 496, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:46, and where b is greater than or equal to a + 14.	N41725
773173	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1215 of SEQ ID NO:47. b is an integer of 15 to 1229. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:47. and where b is greater than or equal to a + 14.	
780154	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1397 of SEQ ID NO:48. b is an integer of 15 to 1411. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:48. and where b is greater than or equal to a + 14.	
780768	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1671 of SEQ ID NO:49. b is an integer of 15 to 1685. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:49, and where b is greater than or equal to a + 14.	
780779	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide	

	sequence described by the general formula of a-b, where a is any integer between 1 to 646 of SEQ ID NO:50, b is an integer of 15 to 660, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:50, and where b is greater than or equal to a + 14.	
782394	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1558 of SEQ ID NO:51, b is an integer of 15 to 1572, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:51, and where b is greater than or equal to a + 14.	R24689, R25853, R34457, R66839, R68536, H22874, H45555, N50184, AA015963, AA028939, AA028938
783160	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 621 of SEQ ID NO:52, b is an integer of 15 to 635, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:52, and where b is greater than or equal to a + 14.	
783506	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1353 of SEQ ID NO:53, b is an integer of 15 to 1367, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:53, and where b is greater than or equal to a + 14.	
784446	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 364 of SEQ ID NO:54, b is an integer of 15 to 378, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:54, and where b is greater than or equal to a + 14.	
784832	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1044 of SEQ ID NO:55, b is an integer of 15 to 1058, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:55, and where b is greater than or equal to a + 14.	
786813	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 668 of SEQ ID NO:56, b is an integer of 15 to 682, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:56, and where b is greater than or equal to a + 14.	W44740, AA235981
792139	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b,	

	where a is any integer between 1 to 630 of SEQ ID NO:57. b is an integer of 15 to 644. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:57. and where b is greater than or equal to a + 14.	
793987	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 752 of SEQ ID NO:58. b is an integer of 15 to 766. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:58. and where b is greater than or equal to a + 14.	
805715	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2347 of SEQ ID NO:59. b is an integer of 15 to 2361. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:59. and where b is greater than or equal to a + 14.	
811111	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1458 of SEQ ID NO:60. b is an integer of 15 to 1472. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:60. and where b is greater than or equal to a + 14.	R11325, R11326. R43655. R43655. R72437, R78096. H23850. N20947, N22686. N25829. N27270. N31401. N40002. N46020. W92748. W92871. AA461202. AA461382
811113	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1658 of SEQ ID NO:61. b is an integer of 15 to 1672. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:61. and where b is greater than or equal to a + 14.	
823902	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1526 of SEQ ID NO:62. b is an integer of 15 to 1540, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:62. and where b is greater than or equal to a + 14.	
826518	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1030 of SEQ ID NO:63. b is an integer of 15 to 1044. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:63. and where b is greater than or equal to a + 14.	T60163. T60223. T61894. R12251. T81471. T81679. T95899. R98321. R98322. H52605. H59085. N27268. N31506. N53499. N54486. N58236. N92460. AA027189. AA045077. AA127016. AA418935. AA426582
826704	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 837 of SEQ ID	

	NO:64. b is an integer of 15 to 851, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:64, and where b is greater than or equal to a + 14.	
827720	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2779 of SEQ ID NO:65, b is an integer of 15 to 2793, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:65, and where b is greater than or equal to a + 14.	
828102	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 289 of SEQ ID NO:66, b is an integer of 15 to 303, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:66, and where b is greater than or equal to a + 14.	
828180	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1396 of SEQ ID NO:67, b is an integer of 15 to 1410, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:67, and where b is greater than or equal to a + 14.	
828386	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1010 of SEQ ID NO:68, b is an integer of 15 to 1024, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:68, and where b is greater than or equal to a + 14.	
828658	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1834 of SEQ ID NO:69, b is an integer of 15 to 1848, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:69, and where b is greater than or equal to a + 14.	
828919	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2668 of SEQ ID NO:70, b is an integer of 15 to 2682, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:70, and where b is greater than or equal to a + 14.	T66771, T66772, T71638, R08935, R09044, R09373, T80114, T85695, R00758, R00759, R12645, R19577, R20545, R22041, R22097, R20545, R59701, R59811, R60034, R60096, R60694, R76255, R81371, R81370, H04390, H04415, H05912, H47622, H47647, R83679, H71735, H72298, N25487, N35542, N49731, N52660, N67681, N75596, W03490, AA044638, AA044702, AA165090, AA164628, AA215698, AA215699, AA233182, AA233196, AA236759, AA256822, AA429489.

		AA428534
829572	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 398 of SEQ ID NO:71, b is an integer of 15 to 412, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:71, and where b is greater than or equal to a + 14.	T63032
830138	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1347 of SEQ ID NO:72, b is an integer of 15 to 1361, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:72, and where b is greater than or equal to a + 14.	
830208	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 914 of SEQ ID NO:73, b is an integer of 15 to 928, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:73, and where b is greater than or equal to a + 14.	R01611, N76461, W74577, W79757, AA045350, AA056064, AA190524
830248	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1172 of SEQ ID NO:74, b is an integer of 15 to 1186, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:74, and where b is greater than or equal to a + 14.	
830275	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 919 of SEQ ID NO:75, b is an integer of 15 to 933, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:75, and where b is greater than or equal to a + 14.	
830286	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1950 of SEQ ID NO:76, b is an integer of 15 to 1964, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:76, and where b is greater than or equal to a + 14.	T90376, R46154, R46154, AA224239, AA467906, AA483293, AA502593, AA513313, AA594445, AA594570, AA594876, AA579404, AA720893, AA767344, AA857646, AA877489, AA954868, AA991634, AI014751, C02074, AA093141
830347	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1788 of SEQ ID NO:77, b is an integer of 15 to 1802, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:77, and where b is greater than or equal to a + 14.	

830348	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 981 of SEQ ID NO:78, b is an integer of 15 to 995, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:78, and where b is greater than or equal to a + 14.	AA983601
830364	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1201 of SEQ ID NO:79, b is an integer of 15 to 1215, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:79, and where b is greater than or equal to a + 14.	
830394	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2646 of SEQ ID NO:80, b is an integer of 15 to 2660, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:80, and where b is greater than or equal to a + 14.	
830398	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1776 of SEQ ID NO:81, b is an integer of 15 to 1790, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:81, and where b is greater than or equal to a + 14.	
830412	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1336 of SEQ ID NO:82, b is an integer of 15 to 1350, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:82, and where b is greater than or equal to a + 14.	
830436	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1732 of SEQ ID NO:83, b is an integer of 15 to 1746, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:83, and where b is greater than or equal to a + 14.	T89041, R38418, R51559, R62385, R63785, H21426, N55384, AA009460, AA039527, AA039526, AA490811, AA588539, AA574253, AA827525, AA975094, D79482, D79908, N55964, C14631, C14891, C14892
830464	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1477 of SEQ ID NO:84, b is an integer of 15 to 1491, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:84, and where b is greater than or equal to a + 14.	H06247, H19227, W52470
830471	Preferably excluded from the present invention are	R28064, R28282, AA143044, AA151127,

	one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 954 of SEQ ID NO:85, b is an integer of 15 to 968, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:85, and where b is greater than or equal to a + 14.	AA165093, AA164631, AA256943, AA765384, D80554
830477	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 3054 of SEQ ID NO:86, b is an integer of 15 to 3068, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:86, and where b is greater than or equal to a + 14.	T71686, R81413, R81414, H52583, H84987, H87923, H88319, H88319, W74073, W79680, AA021098, AA179389, AA182649, AA188175, AA191449, AA228943, AA228942, AA594459, AA737972, C02737
830500	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2216 of SEQ ID NO:87, b is an integer of 15 to 2230, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:87, and where b is greater than or equal to a + 14.	
830509	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1149 of SEQ ID NO:88, b is an integer of 15 to 1163, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:88, and where b is greater than or equal to a + 14.	
830528	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1925 of SEQ ID NO:89, b is an integer of 15 to 1939, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:89, and where b is greater than or equal to a + 14.	
830542	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2018 of SEQ ID NO:90, b is an integer of 15 to 2032, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:90, and where b is greater than or equal to a + 14.	T60268, T61648, T68371, T88743, R00503, R13392, R40908, R40908, H02114, H07926, H29767, H29768, H38826, H93354, W42415, W42513, W61060, W72566, W76560, AA011078, AA011079, AA031697, AA031863, AA058529, AA100913, AA100912, AA129619, AA129593, AA129330, AA128581, AA160087, AA160675, AA173629, AA173985, AA186698, AA188326, AA480672, AA587251, AA576938, AA743161, AA834774, AA872783, AA877207, AA878505, AA923685, AA934427, AA962214, AA995455, AA995857, N88876
830564	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b,	

	where a is any integer between 1 to 1774 of SEQ ID NO:91. b is an integer of 15 to 1788. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:91. and where b is greater than or equal to a + 14.	
830611	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 481 of SEQ ID NO:92. b is an integer of 15 to 495. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:92. and where b is greater than or equal to a + 14.	
830618	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1363 of SEQ ID NO:93. b is an integer of 15 to 1377. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:93. and where b is greater than or equal to a + 14.	R43709. R43709. H09113. H43746. N92632. AA022453. AA120876. AA120889. AA493651. AA493785. AA494347. AA565392. AA743179. AA769161
830620	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2805 of SEQ ID NO:94. b is an integer of 15 to 2819. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:94. and where b is greater than or equal to a + 14.	
830630	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 691 of SEQ ID NO:95. b is an integer of 15 to 705. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:95. and where b is greater than or equal to a + 14.	
830654	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 3458 of SEQ ID NO:96. b is an integer of 15 to 3472. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:96. and where b is greater than or equal to a + 14.	
830660	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1202 of SEQ ID NO:97. b is an integer of 15 to 1216. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:97. and where b is greater than or equal to a + 14.	
830661	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1172 of SEQ ID	

	NO:98. b is an integer of 15 to 1186. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:98. and where b is greater than or equal to a + 14.	
830704	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1106 of SEQ ID NO:99. b is an integer of 15 to 1120. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:99. and where b is greater than or equal to a + 14.	
830765	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1211 of SEQ ID NO:100. b is an integer of 15 to 1225, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:100. and where b is greater than or equal to a + 14.	
830778	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1199 of SEQ ID NO:101. b is an integer of 15 to 1213. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:101. and where b is greater than or equal to a + 14.	
830784	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1550 of SEQ ID NO:102, b is an integer of 15 to 1564, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:102. and where b is greater than or equal to a + 14.	R63323. R66534, AA491630
830800	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1443 of SEQ ID NO:103. b is an integer of 15 to 1457, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:103. and where b is greater than or equal to a + 14.	
830821	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 771 of SEQ ID NO:104, b is an integer of 15 to 785. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:104. and where b is greater than or equal to a + 14.	
830849	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 907 of SEQ ID NO:105. b is an integer of 15 to 921. where both a	AA258128. AA259034. AA262104. AA742612. AA804402

	and b correspond to the positions of nucleotide residues shown in SEQ ID NO:105, and where b is greater than or equal to a + 14.	
830903	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 578 of SEQ ID NO:106, b is an integer of 15 to 592, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:106, and where b is greater than or equal to a + 14.	
830913	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2234 of SEQ ID NO:107, b is an integer of 15 to 2248, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:107, and where b is greater than or equal to a + 14.	R06463, R06517, R48006, R51455, R61502, R72398, R72399, R74489, R74599, H07933, H08039, H61149, H62056, H90758, H90809, N32837, N42283, W40284, W45325, AA079353, AA079592, AA100814, AA102342, AA111844, AA122150, AA134127, AA134128, AA148738, AA148709, AA164240, AA164899, AA164275, AA171881, AA179310, AA179453, AA180811, AA180955, AA187432, AA190377, AA190791, AA190383, AA458475, AA427428, AA468548, AA554518, AA595768, AA595893, AA640601, AA574035, AA658143, AA863401, AA906604, AA995159, C03746, C04875, C05396, AA033510
830920	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 771 of SEQ ID NO:108, b is an integer of 15 to 785, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:108, and where b is greater than or equal to a + 14.	
830938	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 597 of SEQ ID NO:109, b is an integer of 15 to 611, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:109, and where b is greater than or equal to a + 14.	AA053612
830980	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 650 of SEQ ID NO:110, b is an integer of 15 to 664, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:110, and where b is greater than or equal to a + 14.	
831014	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 4051 of SEQ ID NO:111, b is an integer of 15 to 4065, where both a	

	and b correspond to the positions of nucleotide residues shown in SEQ ID NO:111, and where b is greater than or equal to a + 14.	
831026	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1478 of SEQ ID NO:112, b is an integer of 15 to 1492, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:112, and where b is greater than or equal to a + 14.	
831031	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1468 of SEQ ID NO:113, b is an integer of 15 to 1482, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:113, and where b is greater than or equal to a + 14.	R46004, R46004, H06850, N27532, N30567, N30842, N34647, N40349, N41369, N49777, N52708, N62958, W68355, W68490, AA054602, AA193410, AA193648, AA503204, AA688236, AA730103, AA736540, AA747555, AA811522, AA863169, N79861
831055	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 3717 of SEQ ID NO:114, b is an integer of 15 to 3731, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:114, and where b is greater than or equal to a + 14.	
831057	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1301 of SEQ ID NO:115, b is an integer of 15 to 1315, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:115, and where b is greater than or equal to a + 14.	R69415, R69546, H14127, H62767, N62927, N63320, W00649, W01189, AA053293, AA058396, AA149075, AA458528, AA418699, AA418770, AA505598, AA576507, AA730033, AA805864, AA988279, AA991217, D82661, C21298
831062	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1306 of SEQ ID NO:116, b is an integer of 15 to 1320, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:116, and where b is greater than or equal to a + 14.	
831117	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2011 of SEQ ID NO:117, b is an integer of 15 to 2025, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:117, and where b is greater than or equal to a + 14.	R80585, R80586, N49020, AA173625, AA173981, AA557142, AA627866, AA847195, AI015673
831122	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1281 of SEQ ID NO:118, b is an integer of 15 to 1295, where both a and b correspond to the positions of nucleotide	R72079, R72128, AA715820, AA804163, AA809123, AA641490

	residues shown in SEQ ID NO:118, and where b is greater than or equal to a + 14.	
831125	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1243 of SEQ ID NO:119, b is an integer of 15 to 1257, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:119, and where b is greater than or equal to a + 14.	N80647, AA114140, AA143553, AA156386, N68188, AA070867
831132	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 383 of SEQ ID NO:120, b is an integer of 15 to 397, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:120, and where b is greater than or equal to a + 14.	
831152	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 862 of SEQ ID NO:121, b is an integer of 15 to 876, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:121, and where b is greater than or equal to a + 14.	AA765155
831157	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1264 of SEQ ID NO:122, b is an integer of 15 to 1278, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:122, and where b is greater than or equal to a + 14.	T57943, R34275, R35472, R77406, R77405, N23203, N59015, AA160841, AA610280, AA857624, AI089936, AI094724, AI094954
831160	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 3101 of SEQ ID NO:123, b is an integer of 15 to 3115, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:123, and where b is greater than or equal to a + 14.	
831193	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 365 of SEQ ID NO:124, b is an integer of 15 to 379, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:124, and where b is greater than or equal to a + 14.	
831197	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1253 of SEQ ID NO:125, b is an integer of 15 to 1267, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:125, and where b is	AA134613

	greater than or equal to a + 14.	
831217	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 827 of SEQ ID NO:126. b is an integer of 15 to 841. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:126. and where b is greater than or equal to a + 14.	
831239	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1158 of SEQ ID NO:127, b is an integer of 15 to 1172. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:127. and where b is greater than or equal to a + 14.	T68487. T88923. T88994. R09550. R09663. R26714. R26937. H27046. H28228. H30272. H30335, N27966, N36884. N46156. N93575, W21407. W44513. W44514. W47626. W47627. W56215. W60528. W80465. W80574. W92729. AA002237. AA002076. AA099290. AA099291. AA127753. AA127706. AA128275. AA128572. AA148737. AA149497. AA419078. AA423819. AA506117. AA534694. AA552105. AA552219. AA583468. AA622094. AA633205. AA878663. AA911544. AA916173. AA974873. AA988860, AI056396. AI074163. W92753
831248	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 877 of SEQ ID NO:128, b is an integer of 15 to 891. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:128. and where b is greater than or equal to a + 14.	
831313	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2447 of SEQ ID NO:129, b is an integer of 15 to 2461. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:129, and where b is greater than or equal to a + 14.	T61093. T97774. R13148. R31511. R32943. R33906, R33921. R37053. R44148. R44148. R74449, R79209. R79476. H12271. H27631. H30122. R84834. H63166, H71003, H71015, H83387. N23726. N23730. N23773. N52416. N66497, N67917, N68137. N73801. N99428, W95944, AA018712, AA020879. AA429721. AA470397. AA493243, AA507952. AA515358, AA583463. AA617991, AA618186. AA631437. AA566089. AA746085, AA837997, AA878863. AA922678. AA985597. AA947992. AI074096, C03207, C17030. C18106
831369	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2183 of SEQ ID NO:130, b is an integer of 15 to 2197. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:130. and where b is greater than or equal to a + 14.	
831371	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide	

	sequence described by the general formula of a-b. where a is any integer between 1 to 450 of SEQ ID NO:131, b is an integer of 15 to 464. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:131. and where b is greater than or equal to a + 14.	
831373	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1936 of SEQ ID NO:132. b is an integer of 15 to 1950. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:132. and where b is greater than or equal to a + 14.	T50786. T50949. T53797. T53916, T64650, T71681, T71836. T71876. T71877. T74596, T74656, H30426. H46449. H46671, H46670. H46990. H50500. AA419051, AA423809. AA928986
831387	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2079 of SEQ ID NO:133. b is an integer of 15 to 2093. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:133. and where b is greater than or equal to a + 14.	
831410	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 715 of SEQ ID NO:134, b is an integer of 15 to 729, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:134, and where b is greater than or equal to a + 14.	
831448	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1175 of SEQ ID NO:135, b is an integer of 15 to 1189. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:135, and where b is greater than or equal to a + 14.	
831450	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1452 of SEQ ID NO:136, b is an integer of 15 to 1466, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:136, and where b is greater than or equal to a + 14.	
831472	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 126 of SEQ ID NO:137. b is an integer of 15 to 140, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:137. and where b is greater than or equal to a + 14.	
831473	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b,	

	where a is any integer between 1 to 4128 of SEQ ID NO:138. b is an integer of 15 to 4142. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:138. and where b is greater than or equal to a + 14.	
831474	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1733 of SEQ ID NO:139. b is an integer of 15 to 1747. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:139. and where b is greater than or equal to a + 14.	T66054. T89542, R10967. T78297. T83524. T97793, R13138, H08701. H10662. R82956. R96295, R98912, H66237, H79525. N31425, N36736, W76142. W81053, AA010227, AA011652, AA057613. AA057653, AA069088. AA083946. AA084193. AA126186. H70618. H79526, W72916. W80802. AA011433, AA057699, AA057752, AA069023
831494	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1226 of SEQ ID NO:140. b is an integer of 15 to 1240. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:140. and where b is greater than or equal to a + 14.	H14081, H14102. N34979. N42213. N43740, N68241, W69584. W69583, AA507828. AA877181. AA975100. AI000204
831506	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 657 of SEQ ID NO:141. b is an integer of 15 to 671. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:141. and where b is greater than or equal to a + 14.	AA035596. AA577792. AA903617, AA972775, AA996054. C00084
831533	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 3251 of SEQ ID NO:142. b is an integer of 15 to 3265. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:142. and where b is greater than or equal to a + 14.	
831539	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 751 of SEQ ID NO:143. b is an integer of 15 to 765. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:143, and where b is greater than or equal to a + 14.	
831556	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1680 of SEQ ID NO:144, b is an integer of 15 to 1694. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:144. and where b is greater than or equal to a + 14.	H01879. H01880. H43546, H43547, H43548, N58813. N75148. AA428902. AA429101. AA278337. AA662009, AA928907, AA988624
831594	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide	

	sequence described by the general formula of a-b, where a is any integer between 1 to 809 of SEQ ID NO:145. b is an integer of 15 to 823, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:145. and where b is greater than or equal to a + 14.	
831598	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1120 of SEQ ID NO:146. b is an integer of 15 to 1134. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:146. and where b is greater than or equal to a + 14.	
831608	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1472 of SEQ ID NO:147. b is an integer of 15 to 1486. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:147. and where b is greater than or equal to a + 14.	
831613	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 139 of SEQ ID NO:148. b is an integer of 15 to 153, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:148, and where b is greater than or equal to a + 14.	
831622	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 868 of SEQ ID NO:149, b is an integer of 15 to 882. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:149, and where b is greater than or equal to a + 14.	T40013, T40117. T55842. T55892, T58738, T58764, T58805. T58835. T58963, T60293, T60386, T61270. T61322. T61371. T61395, T61404, T61721. T61734. T61735, T61841. T61856, T61857. T61884. T62049. T62065, T62070, T62087. T62113. T62126, T62146. T41021, T62664. T62668, T62669. T62676, T62816. T62819, T62820. T62827. T64118, T64230, T64368. T64422, T64678, T64698, T64747, T67429, T67590, T67709. T67724, T67754, T67785, T67831. T67863. T67888, T67996, T68022, T68038, T68104. T68142, T68217, T68418. T68465. T68484, T68531, T68548, T68557. T68575. T68623, T68633, T68648, T68653. T68760, T68826, T68895, T68969, T68981, T69056, T69126, T69184, T69428, T69605, T69622, T69678, T69699, T70483, T70907. T70960. T71019, T71080. T71224, T71297, T71437, T71660. T71885, T71903, T71985. T72050. T72115, T72129, T72147, T72158. T72263, T72310. T72415, T72769, T72775. T72802. T72897, T72903, T72922. T72924. T73035. T73068. T73167. T73224, T73305. T73392, T73458, T73473. T73482, T73525. T73540. T73541. T73551, T73560, T73599. T73606. T73619. T73637, T73644, T73655. T73659. T73660. T73800,

		T73887, T73913, T73945, T73950, T74048, T74200, T74201, T74423, T74477, T74559, T74706, T74827, T99112, R05781, R05867, H47944, R95831, H60131, H65347, H65551, H68454, H68777, H73380, H73381, H79275, H79386, H82213, H82307, H93202, H93992, H93991, H94491, H94804, H95257, H95307, H95341, N28274, N58244, N68733, N77623, N80767, N91623, W07555, W80697, AA004677, AA004255, AA033869, AA034057, AA234464, AA491842, C20927
831631	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1494 of SEQ ID NO:150, b is an integer of 15 to 1508, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:150, and where b is greater than or equal to a + 14.	
831632	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1218 of SEQ ID NO:151, b is an integer of 15 to 1232, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:151, and where b is greater than or equal to a + 14.	T60158, T60218, T62213, T62652, T62877, T62966, T63329, T63951, T64542, T64634, T65965, T90119, T91565, T91610, T92138, T94160, T94999, T90219, T83025, T84028, T84029, T84511, R22325, R22619, R22620, R25250, R25595, R26992, R27328, R32850, R32954, R33282, R44282, R47779, R48151, R48152, R48322, R48428, R48538, R50415, R52277, R52278, R54608, R44282, R55376, R70352, R72103, R72155, R72280, R72317, R72367, R72368, R72371, R72372, R72716, R73784, R74375, R77393, R77394, R77892, R77987, R81485, R81725, H05676, H15941, H22149, H22193, H24533, H25059, H26810, H27743, H27803, H28012, H28066, H28290, H28291, H30654, H39748, H39761, H41932, H41979, H42063, H42642, H42766, H42767, H44628, H45776, H45777, H46386, H46404, R93135, R93942, R94660, R94661, H50708, H50709, H50720, H50812, H50811, H50826, H61352, H62379, H63665, H63944, H66336, H66385, H70746, H73887, H74080, H74176, H82646, H82647, H86555, H87065, H87719, H91147, H91197, H93078, H93211, H98788, N24993, N25111, N30229, N32159, N34033, N36553, N41829, N42292, N46951, N49340, N52921, N55462, N57121, N69863, N76837, N80667, N92844, N93333, N93683, N94449, N95075, W16427, W15325, W23470, W23480, W25070, W25186, W30795,

		W38675, W39219, W39393, W69270, W69557, AA019864, AA022662, AA022669, AA022768, AA025335, AA024417, AA031282, AA031281, AA032192, AA039752, AA040328, AA040307, AA041359, AA041442, AA057720, AA074855, AA086192, AA099717, AA099716, AA100416, AA142927, AA143150, AA149895, AA150239, AA150313, AA176193, AA459294, AA464165, AA425845, AA425899, AA428397, AA430393, AA427364, AA469113, AA505259, AA515918, AA516032, AA527677, AA533908, AA541266, AA554671, AA555247, AA557794, AA565267, AA582247, AA584415, AA588477, AA593255, AA595311, AA595376, AA604354, AA622137, AA573444, AA574244, AA732469, AA740323, AA741360, AA742872, AA749432, AA807903, AA808285, AA872498, AA873181, AA878139, AA878294, AA909748, AA937058, AA987672, AA994225, AI076066, W07696
831653	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 985 of SEQ ID NO:152, b is an integer of 15 to 999, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:152, and where b is greater than or equal to a + 14.	
831655	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1198 of SEQ ID NO:153, b is an integer of 15 to 1212, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:153, and where b is greater than or equal to a + 14.	N95539, W24228, W37689, AA019086, AA430215
831708	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2347 of SEQ ID NO:154, b is an integer of 15 to 2361, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:154, and where b is greater than or equal to a + 14.	
831738	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1817 of SEQ ID NO:155, b is an integer of 15 to 1831, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:155, and where b is greater than or equal to a + 14.	

831741	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1172 of SEQ ID NO:156, b is an integer of 15 to 1186, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:156, and where b is greater than or equal to a + 14.	T47689. T80213. H11356. H13411. R86865. R87546. N35663. AA081442. AA161001. C17978. C18946
831754	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1434 of SEQ ID NO:157, b is an integer of 15 to 1448, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:157, and where b is greater than or equal to a + 14.	
831760	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 990 of SEQ ID NO:158, b is an integer of 15 to 1004, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:158, and where b is greater than or equal to a + 14.	R73907, R74000. N64405. AA196765. AA232516. AA806432. AA837776. AI017699
831780	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1495 of SEQ ID NO:159, b is an integer of 15 to 1509, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:159, and where b is greater than or equal to a + 14.	AA100654. AA112750, AA594472, AA731487
831796	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2146 of SEQ ID NO:160, b is an integer of 15 to 2160, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:160, and where b is greater than or equal to a + 14.	H14891. W74005. AA623010. D80585. AI096496. W38434
831800	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 3595 of SEQ ID NO:161, b is an integer of 15 to 3609, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:161, and where b is greater than or equal to a + 14.	
831807	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1589 of SEQ ID NO:162, b is an integer of 15 to 1603, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:162, and where b is greater than or equal to a + 14.	
831812	Preferably excluded from the present invention are	

	one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 839 of SEQ ID NO:163, b is an integer of 15 to 853, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:163, and where b is greater than or equal to a + 14.	
831813	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1903 of SEQ ID NO:164, b is an integer of 15 to 1917, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:164, and where b is greater than or equal to a + 14.	H14269, AA069213, AA808661
831830	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2406 of SEQ ID NO:165, b is an integer of 15 to 2420, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:165, and where b is greater than or equal to a + 14.	H04695, AA112742, AA251641, AA506539
831860	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2047 of SEQ ID NO:166, b is an integer of 15 to 2061, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:166, and where b is greater than or equal to a + 14.	
831872	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2553 of SEQ ID NO:167, b is an integer of 15 to 2567, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:167, and where b is greater than or equal to a + 14.	R15368, R36227, R36228, R36669, R39751, H12331, H12382, H47986, R84945, R97224, R97223, W78107, AA149874, AA193466, AA193348, AA287444, AA535607, AA687414, AA689396, AA748665, AA809715
831896	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2310 of SEQ ID NO:168, b is an integer of 15 to 2324, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:168, and where b is greater than or equal to a + 14.	R59635, N28389, AA158646, AA158659, AA188594, AA190705, AA459426, AA465652
831928	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1770 of SEQ ID NO:169, b is an integer of 15 to 1784, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:169, and where b is greater than or equal to a + 14.	
831949	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide	

	sequence described by the general formula of a-b, where a is any integer between 1 to 1282 of SEQ ID NO:170, b is an integer of 15 to 1296, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:170, and where b is greater than or equal to a + 14.	
831950	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1883 of SEQ ID NO:171, b is an integer of 15 to 1897, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:171, and where b is greater than or equal to a + 14.	
831953	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1709 of SEQ ID NO:172, b is an integer of 15 to 1723, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:172, and where b is greater than or equal to a + 14.	
831975	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1402 of SEQ ID NO:173, b is an integer of 15 to 1416, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:173, and where b is greater than or equal to a + 14.	
832036	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1942 of SEQ ID NO:174, b is an integer of 15 to 1956, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:174, and where b is greater than or equal to a + 14.	R60820, R78776, R79082, H01912, H04427, N34789, N44513, W20183, W35150, AA159701, AA159628, AA470753, AA659808
832047	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1675 of SEQ ID NO:175, b is an integer of 15 to 1689, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:175, and where b is greater than or equal to a + 14.	R21952, R21968, R26963, R78028, H75703, H75632, H84015, H88136, H88135, H94007, H95012, N24834, N30818, N31761, N41592, N79533, W16686, W24639, W38979, W87777, W87875, AA121146, AA122426, AA131874, AA131978, AA147083, AA147140, AA282507, AA282605, AA558945, H84016, AA587558, AA830662, AA866026, AA917653, AI017813, C06340
832078	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1002 of SEQ ID NO:176, b is an integer of 15 to 1016, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:176, and where b is greater than or equal to a + 14.	

832100	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1350 of SEQ ID NO:177, b is an integer of 15 to 1364, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:177, and where b is greater than or equal to a + 14.	
832104	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 726 of SEQ ID NO:178, b is an integer of 15 to 740, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:178, and where b is greater than or equal to a + 14.	
832268	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1396 of SEQ ID NO:179, b is an integer of 15 to 1410, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:179, and where b is greater than or equal to a + 14.	
832270	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1479 of SEQ ID NO:180, b is an integer of 15 to 1493, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:180, and where b is greater than or equal to a + 14.	
832279	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2026 of SEQ ID NO:181, b is an integer of 15 to 2040, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:181, and where b is greater than or equal to a + 14.	
832317	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 955 of SEQ ID NO:182, b is an integer of 15 to 969, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:182, and where b is greater than or equal to a + 14.	R81508, H12476, H86945, AA053747, AA115783, AA133749, AA134163, AA134164, AA224985, AA228334, AA228423, AA229297, AA640471, AA657793, AA687568, AA904162, AA983632
832354	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1438 of SEQ ID NO:183, b is an integer of 15 to 1452, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:183, and where b is greater than or equal to a + 14.	
832364	Preferably excluded from the present invention are	

	one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2105 of SEQ ID NO:184. b is an integer of 15 to 2119. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:184. and where b is greater than or equal to a + 14.	
832378	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1311 of SEQ ID NO:185. b is an integer of 15 to 1325. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:185. and where b is greater than or equal to a + 14.	
832385	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 419 of SEQ ID NO:186. b is an integer of 15 to 433. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:186. and where b is greater than or equal to a + 14.	
832428	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 845 of SEQ ID NO:187. b is an integer of 15 to 859. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:187, and where b is greater than or equal to a + 14.	AA031420
832485	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 819 of SEQ ID NO:188. b is an integer of 15 to 833. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:188. and where b is greater than or equal to a + 14.	R63025. R66741. H53264. H53265. H53769. H53822. H54405. H54489. H81182. H91282. AA526672. H81181
832494	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2197 of SEQ ID NO:189, b is an integer of 15 to 2211, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:189. and where b is greater than or equal to a + 14.	T61040, T61591, T90055. T90157, T92840, T93714. T96177, T77726. H04686, H05450. H06997, H20176. H20366, R92666, H65144, H92413, N64053, N64060. N66714, N71338, N71388, N79742. N95497, N99884. W07259. W24989. W37394, W37657. W40208, W40260. W40532, W45430, W56165, W60427. W60986. W61080. W63739, W72328, W73757, W74394. AA025512, AA026057, AA065019. AA069295, AA069798. AA069845. AA070441, AA075793. AA083393. AA083394, AA084576. AA086181. AA099019. AA099097, AA099493. AA102003. AA100395. AA100554. AA100555. AA100638. AA101578. AA113226. AA113811. AA115645. AA115646.

		AA115888. AA115889. AA122231. AA121108. AA121596. AA121671. AA121743. AA126075. AA126102. AA126181. AA126295. AA126404. AA129470. AA129665. AA133945. AA133946. AA146752. AA155947. AA157140. AA157228. AA159947. AA160900. AA164889. AA164890. AA164840. AA164839. AA172107. AA182040. AA171714. AA187244. AA187376. AA186418. AA188846. AA189131. AA196155. AA196257. AA196611. AA196789. AA196961. AA223155. AA223415. AA226816. AA226856. AA227026. AA227109. AA227208. AA243161. AA243205. AA428759. AA429347. AA514858. AA535250. AA555125. AA565075, AA565168. AA581531. AA587192. AA576761. AA580523. AA659699. AA688240. AA689484. AA689543. AA689313. AA729979. AA740203. AA747258. AA747399. AA747993. AA837961. AA865930. AA906561. AA910350, AA919085. AA931143. AA999884. AI051141. F19298. W22294, W22759. W22970. W25820, W73709, C02713. C02766. C03390. C03613, C04202. C05262. C05272. R28954. R29028, R29032. AA062628. AA090039, C18989
832512	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1645 of SEQ ID NO:190. b is an integer of 15 to 1659, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:190, and where b is greater than or equal to a + 14.	
832515	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 3880 of SEQ ID NO:191, b is an integer of 15 to 3894, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:191, and where b is greater than or equal to a + 14.	
832526	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 681 of SEQ ID NO:192, b is an integer of 15 to 695, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:192, and where b is greater than or equal to a + 14.	
832575	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide	R28543. R28684. R55782. R55862, R62797. R62843. R67670. R71154.

	sequence described by the general formula of a-b, where a is any integer between 1 to 3117 of SEQ ID NO:193, b is an integer of 15 to 3131, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:193, and where b is greater than or equal to a + 14.	R71651, N20642, N24838, N25562, N29014, N31768, N34161, N57560, N72111, W00338, W00374, W30889, W52729, W59982, W68047, W68189, AA019459, AA043870, AA044336, AA045040, AA045041, AA115599, AA115134, AA131177, AA165259, AA165260, AA165191, AA165192, AA164549, AA164550, AA261988, AA424972, AA279863, AA458832, AA459024, AA505193, AA507542, AA514388, AA622542, AA689232, AA689233, AA804910, AA807169, AA832321, AA878091, AA904023, AA936069, AA936071, AA946621, C00143, N86645, AA010988, AA641236, AA641464, C18301
832576	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2044 of SEQ ID NO:194, b is an integer of 15 to 2058, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:194, and where b is greater than or equal to a + 14.	
832588	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 817 of SEQ ID NO:195, b is an integer of 15 to 831, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:195, and where b is greater than or equal to a + 14.	
832634	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 947 of SEQ ID NO:196, b is an integer of 15 to 961, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:196, and where b is greater than or equal to a + 14.	
832728	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 592 of SEQ ID NO:197, b is an integer of 15 to 606, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:197, and where b is greater than or equal to a + 14.	
833094	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 379 of SEQ ID NO:198, b is an integer of 15 to 393, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:198, and where b is greater than or equal to a + 14.	

833395	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1047 of SEQ ID NO:199, b is an integer of 15 to 1061. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:199. and where b is greater than or equal to a + 14.	
834326	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1345 of SEQ ID NO:200. b is an integer of 15 to 1359. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:200. and where b is greater than or equal to a + 14.	
834583	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 712 of SEQ ID NO:201. b is an integer of 15 to 726. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:201. and where b is greater than or equal to a + 14.	
834944	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2700 of SEQ ID NO:202. b is an integer of 15 to 2714. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:202. and where b is greater than or equal to a + 14.	
835012	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 408 of SEQ ID NO:203. b is an integer of 15 to 422. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:203. and where b is greater than or equal to a + 14.	
835104	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2325 of SEQ ID NO:204, b is an integer of 15 to 2339. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:204, and where b is greater than or equal to a + 14.	
835332	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1641 of SEQ ID NO:205. b is an integer of 15 to 1655. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:205. and where b is greater than or equal to a + 14.	
835487	Preferably excluded from the present invention are	

	one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 5131 of SEQ ID NO:206, b is an integer of 15 to 5145, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:206, and where b is greater than or equal to a + 14.	
836182	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 473 of SEQ ID NO:207, b is an integer of 15 to 487, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:207, and where b is greater than or equal to a + 14.	
836522	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2282 of SEQ ID NO:208, b is an integer of 15 to 2296, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:208, and where b is greater than or equal to a + 14.	
836655	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 611 of SEQ ID NO:209, b is an integer of 15 to 625, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:209, and where b is greater than or equal to a + 14.	
836787	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1537 of SEQ ID NO:210, b is an integer of 15 to 1551, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:210, and where b is greater than or equal to a + 14.	W56241, W56321, AA009901, AA521313, AA732599, AA730271, AA766911, AA767313, W27009
836789	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 997 of SEQ ID NO:211, b is an integer of 15 to 1011, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:211, and where b is greater than or equal to a + 14.	T68817, R22374, R27362, H38950, R89148, R91088, H68416, H93594, N33889, N47045, N56761, W19886, W44630, W61370, W86385, AA036993, AA065062, AA101017, AA121107, AA130485, AA147474, AA160596, AA282977
838577	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1625 of SEQ ID NO:212, b is an integer of 15 to 1639, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:212, and where b is greater than or equal to a + 14.	T53501, T40735, T63398, T63985, T64053, T64155, T64284, T93511, T94941, T94995, T96340, R00890, R01553, R12738, R12739, R39790, R54423, R66373, R66595, R67104, R67219, R79151, R79152, R82180, R82224, R82470, R82471, H01963, H02048, H02758, H02759, H05982, H19484, H19567, H19882, H19900, H44901, H44938, H44978, H46289, H46871, H49538,

		H49781, H53114, H53220, H54300, H56079, H56279, H79695, H79696, N23140, N25755, N25850, N26983, N29784, N32719, N36477, N40104, N42924, N44580, N50724, N55052, N67751, N93444, N98425, N98537, W02803, W21105, W23673, W30688, W30899, W35106, W45448, W45449, W45661, W44441, W46823, W46872, W47373, W47374, W52205, W58331, W58652, W96332, AA007386, AA007676, AA011363, AA016311, AA017511, AA018464, AA019899, AA025040, AA025039, AA029796, AA029797, AA031472, AA035395, AA035396, AA037272, AA040791, AA041228, AA042893, AA043029, AA055565, AA056185, AA056186, AA056621, AA056726, AA069193, AA079705, AA082517, AA084044, AA084043, AA115273, AA115056, AA132031, AA132153, AA149267, AA149284, AA149378, AA158093, AA158103, AA158364, AA158904, AA158905, AA165106, AA220957, AA235312, AA251169, AA421302, AA421425, AA428706, AA429291, AA513790, AA531603, AA551736, AA554236, AA605236, AA604674, AA604939, AA612935, AA617731, AA627300, AA687527, AA732095, AA740760, AA765135, AA765136, AA765296, AA765891, AA888144, AA908665, AA928038, AA936934, AA961143, AA987647, AA975856, W03595, C03206, C18055, AA164690, AA218956, AA291352, AA292329, AA293276, AA393988, AA398076, AA410772, D12417, AA442678, AA442969, AA454814, AA454888, AA482370, AA486098, AA486161, AA625879, AA678365, AA679281, AA703505, AA722872, AA732793, AA989559, AI003448, AI014938, AI022070, AI084792, AI092360
838717	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2113 of SEQ ID NO:213, b is an integer of 15 to 2127, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:213, and where b is greater than or equal to a + 14.	
839008	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1152 of SEQ ID	

	NO:214. b is an integer of 15 to 1166. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:214. and where b is greater than or equal to a + 14.	
840063	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 3309 of SEQ ID NO:215. b is an integer of 15 to 3323, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:215. and where b is greater than or equal to a + 14.	
840533	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1394 of SEQ ID NO:216, b is an integer of 15 to 1408. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:216. and where b is greater than or equal to a + 14.	
840669	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2097 of SEQ ID NO:217. b is an integer of 15 to 2111, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:217. and where b is greater than or equal to a + 14.	T71029, T79145. T79226. T99989. R59589, R61735, R61734. R66190. R67070. H16201. H16200. H22960. H84137, H85574, H98850. N23572. N26340. N56614, W72249. W76334. W86530, W87654, W87653. AA057869. AA122103, AA129545, AA136524. AA137122. AA429808, AA525242. AA558970. H99223. AA584317. AA595168. AA825180. AA931521. AA938437, AI017369, N29659. N68604. W86674, AA007246
841140	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2479 of SEQ ID NO:218. b is an integer of 15 to 2493, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:218. and where b is greater than or equal to a + 14.	
841386	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1245 of SEQ ID NO:219. b is an integer of 15 to 1259, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:219. and where b is greater than or equal to a + 14.	AA429393, AA429394. AA493187, AA807096, AA836046
841480	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1835 of SEQ ID NO:220. b is an integer of 15 to 1849. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:220. and where b is greater than or equal to a + 14.	
841509	Preferably excluded from the present invention are	

	one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1253 of SEQ ID NO:221, b is an integer of 15 to 1267, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:221, and where b is greater than or equal to a + 14.	
841616	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 740 of SEQ ID NO:222, b is an integer of 15 to 754, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:222, and where b is greater than or equal to a + 14.	
841900	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1244 of SEQ ID NO:223, b is an integer of 15 to 1258, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:223, and where b is greater than or equal to a + 14.	R87848, AA806230, Z28656
842054	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 570 of SEQ ID NO:224, b is an integer of 15 to 584, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:224, and where b is greater than or equal to a + 14.	
843061	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 3435 of SEQ ID NO:225, b is an integer of 15 to 3449, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:225, and where b is greater than or equal to a + 14.	
843544	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1852 of SEQ ID NO:226, b is an integer of 15 to 1866, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:226, and where b is greater than or equal to a + 14.	
844092	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1050 of SEQ ID NO:227, b is an integer of 15 to 1064, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:227, and where b is greater than or equal to a + 14.	
844270	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide	

	sequence described by the general formula of a-b, where a is any integer between 1 to 359 of SEQ ID NO:228, b is an integer of 15 to 373, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:228, and where b is greater than or equal to a + 14.	
844604	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2830 of SEQ ID NO:229, b is an integer of 15 to 2844, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:229, and where b is greater than or equal to a + 14.	
844685	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1784 of SEQ ID NO:230, b is an integer of 15 to 1798, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:230, and where b is greater than or equal to a + 14.	
844855	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1809 of SEQ ID NO:231, b is an integer of 15 to 1823, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:231, and where b is greater than or equal to a + 14.	
845101	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 956 of SEQ ID NO:232, b is an integer of 15 to 970, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:232, and where b is greater than or equal to a + 14.	
845141	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 953 of SEQ ID NO:233, b is an integer of 15 to 967, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:233, and where b is greater than or equal to a + 14.	
845220	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 2149 of SEQ ID NO:234, b is an integer of 15 to 2163, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:234, and where b is greater than or equal to a + 14.	R70310, H02204, H28992, H29096, W67797, W67855, W72320, AA459289, AA459519, AA430385, AA746169
845434	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b,	

	where a is any integer between 1 to 1307 of SEQ ID NO:235. b is an integer of 15 to 1321. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:235. and where b is greater than or equal to a + 14.	
845510	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 669 of SEQ ID NO:236. b is an integer of 15 to 683. where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:236. and where b is greater than or equal to a + 14.	
845600	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 2101 of SEQ ID NO:237. b is an integer of 15 to 2115, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:237, and where b is greater than or equal to a + 14.	
845882	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1628 of SEQ ID NO:238, b is an integer of 15 to 1642, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:238, and where b is greater than or equal to a + 14.	
846007	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 454 of SEQ ID NO:239, b is an integer of 15 to 468, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:239, and where b is greater than or equal to a + 14.	H81424
846280	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1315 of SEQ ID NO:240, b is an integer of 15 to 1329, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:240, and where b is greater than or equal to a + 14.	
846286	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b. where a is any integer between 1 to 1638 of SEQ ID NO:241, b is an integer of 15 to 1652, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:241, and where b is greater than or equal to a + 14.	
846388	Preferably excluded from the present invention are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 to 1932 of SEQ ID	

	NO:242. b is an integer of 15 to 1946, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:242, and where b is greater than or equal to a + 14.	

Polynucleotide and Polypeptide Variants

The present invention is directed to variants of the polynucleotide sequence disclosed in SEQ ID NO:X or the complementary strand thereto, and/or the cDNA sequence contained in a cDNA clone contained in the deposit.

The present invention also encompasses variants of a colon and/or colon cancer polypeptide sequence disclosed in SEQ ID NO:Y, a polypeptide sequence encoded by the polynucleotide sequence in SEQ ID NO:X, and/or a polypeptide sequence encoded by the cDNA in the related cDNA clone contained in the deposit.

"Variant" refers to a polynucleotide or polypeptide differing from the polynucleotide or polypeptide of the present invention, but retaining essential properties thereof. Generally, variants are overall closely similar, and, in many regions, identical to the polynucleotide or polypeptide of the present invention.

The present invention is also directed to nucleic acid molecules which comprise, or alternatively consist of, a nucleotide sequence which is at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100%, identical to, for example, the nucleotide coding sequence in SEQ ID NO:X or the complementary strand thereto, the nucleotide coding sequence of the related cDNA contained in a deposited library or the complementary strand thereto, a nucleotide sequence encoding the polypeptide of SEQ ID NO:Y, a nucleotide sequence encoding a polypeptide sequence encoded by the nucleotide sequence in SEQ ID NO:X, a nucleotide sequence encoding the polypeptide encoded by the cDNA in the related cDNA contained in a deposited library, and/or polynucleotide fragments of any of these nucleic acid molecules (e.g., those fragments described herein). Polypeptides encoded by these nucleic acid molecules are also encompassed by the invention. In another embodiment, the invention encompasses nucleic acid molecules which comprise or alternatively consist of, a polynucleotide which hybridizes under stringent hybridization conditions, or alternatively, under low stringency conditions, to the nucleotide coding sequence in SEQ ID NO:X, the nucleotide coding sequence of the related cDNA clone contained in a deposited library, a nucleotide sequence encoding the polypeptide of SEQ ID NO:Y, a nucleotide sequence encoding a polypeptide sequence encoded by the nucleotide sequence in SEQ ID NO:X, a nucleotide sequence encoding the polypeptide encoded by the cDNA in the related cDNA clone contained in a deposited library, and/or polynucleotide fragments of any of these nucleic acid molecules (e.g., those fragments described herein). Polynucleotides which

hybridize to the complement of these nucleic acid molecules under stringent hybridization conditions or alternatively, under lower stringency conditions. are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

The present invention is also directed to polypeptides which comprise, or alternatively consist of, an amino acid sequence which is at least 80%, 85%, 90%, 95%, 96%, 97%. 98%, 99% or 100% identical to, for example. the polypeptide sequence shown in SEQ ID NO:Y, a polypeptide sequence encoded by the nucleotide sequence in SEQ ID NO:X, a polypeptide sequence encoded by the cDNA in the related cDNA clone contained in a deposited library, and/or polypeptide fragments of any of these polypeptides (e.g., those fragments described herein). Polynucleotides which hybridize to the complement of the nucleic acid molecules encoding these polypeptides under stringent hybridization conditions, or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

By a nucleic acid having a nucleotide sequence at least, for example, 95% "identical" to a reference nucleotide sequence of the present invention, it is intended that the nucleotide sequence of the nucleic acid is identical to the reference sequence except that the nucleotide sequence may include up to five point mutations per each 100 nucleotides of the reference nucleotide sequence encoding the polypeptide. In other words, to obtain a nucleic acid having a nucleotide sequence at least 95% identical to a reference nucleotide sequence, up to 5% of the nucleotides in the reference sequence may be deleted or substituted with another nucleotide, or a number of nucleotides up to 5% of the total nucleotides in the reference sequence may be inserted into the reference sequence. The query sequence may be, for example, an entire sequence referred to in Table 1, an ORF (open reading frame), or any fragment specified as described herein.

As a practical matter, whether any particular nucleic acid molecule or polypeptide is at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to a nucleotide sequence of the present invention can be determined conventionally using known computer programs. A preferred method for determining the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci. 6:237-245 (1990)). In a sequence alignment the query and subject sequences are both DNA sequences. An RNA sequence can be

compared by converting U's to T's. The result of said global sequence alignment is in percent identity. Preferred parameters used in a FASTDB alignment of DNA sequences to calculate percent identiy are: Matrix=Unitary, k-tuple=4, Mismatch Penalty=1, Joining Penalty=30. Randomization Group Length=0, Cutoff Score=1, Gap Penalty=5, Gap Size Penalty 0.05, Window Size=500 or the lenght of the subject nucleotide sequence, whichever is shorter.

If the subject sequence is shorter than the query sequence because of 5' or 3' deletions, not because of internal deletions, a manual correction must be made to the results. This is because the FASTDB program does not account for 5' and 3' truncations of the subject sequence when calculating percent identity. For subject sequences truncated at the 5' or 3' ends, relative to the query sequence, the percent identity is corrected by calculating the number of bases of the query sequence that are 5' and 3' of the subject sequence, which are not matched/aligned, as a percent of the total bases of the query sequence. Whether a nucleotide is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This corrected score is what is used for the purposes of the present invention. Only bases outside the 5' and 3' bases of the subject sequence, as displayed by the FASTDB alignment, which are not matched/aligned with the query sequence, are calculated for the purposes of manually adjusting the percent identity score.

For example, a 90 base subject sequence is aligned to a 100 base query sequence to determine percent identity. The deletions occur at the 5' end of the subject sequence and therefore, the FASTDB alignment does not show a matched/alignment of the first 10 bases at 5' end. The 10 unpaired bases represent 10% of the sequence (number of bases at the 5' and 3' ends not matched/total number of bases in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 bases were perfectly matched the final percent identity would be 90%. In another example, a 90 base subject sequence is compared with a 100 base query sequence. This time the deletions are internal deletions so that there are no bases on the 5' or 3' of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only bases 5' and 3' of the subject sequence which are not matched/aligned with the query sequence are manually corrected for. No other

manual corrections are to made for the purposes of the present invention.

By a polypeptide having an amino acid sequence at least, for example, 95% "identical" to a query amino acid sequence of the present invention, it is intended that the amino acid sequence of the subject polypeptide is identical to the query sequence except that the subject polypeptide sequence may include up to five amino acid alterations per each 100 amino acids of the query amino acid sequence. In other words, to obtain a polypeptide having an amino acid sequence at least 95% identical to a query amino acid sequence, up to 5% of the amino acid residues in the subject sequence may be inserted, deleted, (indels) or substituted with another amino acid. These alterations of the reference sequence may occur at the amino or carboxy terminal positions of the reference amino acid sequence or anywhere between those terminal positions, interspersed either individually among residues in the reference sequence or in one or more contiguous groups within the reference sequence.

As a practical matter, whether any particular polypeptide is at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to, for instance, the amino acid sequence in SEQ ID NO:Y or a fragment thereof, the amino acid sequence encoded by the nucleotide sequence in SEQ ID NO:X or a fragment thereof, or the amino acid sequence encoded by the cDNA in the related cDNA clone contained in a deposited library, or a fragment thereof, can be determined conventionally using known computer programs. A preferred method for determing the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci.6:237- 245(1990)). In a sequence alignment the query and subject sequences are either both nucleotide sequences or both amino acid sequences. The result of said global sequence alignment is in percent identity. Preferred parameters used in a FASTDB amino acid alignment are: Matrix=PAM 0, k-tuple=2, Mismatch Penalty=1, Joining Penalty=20, Randomization Group Length=0, Cutoff Score=1, Window Size=sequence length, Gap Penalty=5, Gap Size Penalty=0.05, Window Size=500 or the length of the subject amino acid sequence, whichever is shorter.

If the subject sequence is shorter than the query sequence due to N- or C-terminal deletions. not because of internal deletions, a manual correction must be made to the results. This is because the FASTDB program does not account for N- and C-terminal truncations of the subject sequence when calculating global percent identity. For subject sequences

truncated at the N- and C-termini, relative to the query sequence, the percent identity is corrected by calculating the number of residues of the query sequence that are N- and C-terminal of the subject sequence, which are not matched/aligned with a corresponding subject residue, as a percent of the total bases of the query sequence. Whether a residue is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This final percent identity score is what is used for the purposes of the present invention. Only residues to the N- and C-termini of the subject sequence, which are not matched/aligned with the query sequence, are considered for the purposes of manually adjusting the percent identity score. That is, only query residue positions outside the farthest N- and C- terminal residues of the subject sequence.

For example, a 90 amino acid residue subject sequence is aligned with a 100 residue query sequence to determine percent identity. The deletion occurs at the N-terminus of the subject sequence and therefore, the FASTDB alignment does not show a matching/alignment of the first 10 residues at the N-terminus. The 10 unpaired residues represent 10% of the sequence (number of residues at the N- and C- termini not matched/total number of residues in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 residues were perfectly matched the final percent identity would be 90%. In another example, a 90 residue subject sequence is compared with a 100 residue query sequence. This time the deletions are internal deletions so there are no residues at the N- or C-termini of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only residue positions outside the N- and C-terminal ends of the subject sequence, as displayed in the FASTDB alignment, which are not matched/aligned with the query sequence are manually corrected for. No other manual corrections are to made for the purposes of the present invention.

The variants may contain alterations in the coding regions, non-coding regions, or both. Especially preferred are polynucleotide variants containing alterations which produce silent substitutions, additions, or deletions, but do not alter the properties or activities of the encoded polypeptide. Nucleotide variants produced by silent substitutions due to the degeneracy of the genetic code are preferred. Moreover, variants in which less than 50, less

than 40, less than 30, less than 20, less than 10, or 5-50, 5-25, 5-10, 1-5, or 1-2 amino acids are substituted, deleted, or added in any combination are also preferred. Polynucleotide variants can be produced for a variety of reasons, e.g., to optimize codon expression for a particular host (change codons in the human mRNA to those preferred by a bacterial host such as E. coli).

Naturally occurring variants are called "allelic variants," and refer to one of several alternate forms of a gene occupying a given locus on a chromosome of an organism. (Genes II, Lewin, B., ed., John Wiley & Sons, New York (1985).) These allelic variants can vary at either the polynucleotide and/or polypeptide level and are included in the present invention. Alternatively, non-naturally occurring variants may be produced by mutagenesis techniques or by direct synthesis.

Using known methods of protein engineering and recombinant DNA technology, variants may be generated to improve or alter the characteristics of the polypeptides of the present invention. For instance, as discussed herein, one or more amino acids can be deleted from the N-terminus or C-terminus of the polypeptide of the present invention without substantial loss of biological function. The authors of Ron et al., J. Biol. Chem. 268: 2984-2988 (1993), reported variant KGF proteins having heparin binding activity even after deleting 3, 8, or 27 amino-terminal amino acid residues. Similarly, Interferon gamma exhibited up to ten times higher activity after deleting 8-10 amino acid residues from the carboxy terminus of this protein. (Dobeli et al., J. Biotechnology 7:199-216 (1988).)

Moreover, ample evidence demonstrates that variants often retain a biological activity similar to that of the naturally occurring protein. For example, Gayle and coworkers (J. Biol. Chem 268:22105-22111 (1993)) conducted extensive mutational analysis of human cytokine IL-1a. They used random mutagenesis to generate over 3,500 individual IL-1a mutants that averaged 2.5 amino acid changes per variant over the entire length of the molecule. Multiple mutations were examined at every possible amino acid position. The investigators found that "[m]ost of the molecule could be altered with little effect on either [binding or biological activity]." (See, Abstract.) In fact, only 23 unique amino acid sequences, out of more than 3,500 nucleotide sequences examined, produced a protein that significantly differed in activity from wild-type.

Furthermore, as discussed herein, even if deleting one or more amino acids from the N-terminus or C-terminus of a polypeptide results in modification or loss of one or more

biological functions, other biological activities may still be retained. For example, the ability of a deletion variant to induce and/or to bind antibodies which recognize the secreted form will likely be retained when less than the majority of the residues of the secreted form are removed from the N-terminus or C-terminus. Whether a particular polypeptide lacking N- or C-terminal residues of a protein retains such immunogenic activities can readily be determined by routine methods described herein and otherwise known in the art.

Thus, the invention further includes polypeptide variants which show a functional activity (e.g., biological activity) of the polypeptide of the invention of which they are a variant. Such variants include deletions, insertions, inversions, repeats, and substitutions selected according to general rules known in the art so as have little effect on activity.

The present application is directed to nucleic acid molecules at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% identical to the nucleic acid sequences disclosed herein or fragments thereof, (e.g., including but not limited to fragments encoding a polypeptide having the amino acid sequence of an N and/or C terminal deletion), irrespective of whether they encode a polypeptide having functional activity. This is because even where a particular nucleic acid molecule does not encode a polypeptide having functional activity, one of skill in the art would still know how to use the nucleic acid molecule, for instance, as a hybridization probe or a polymerase chain reaction (PCR) primer. Uses of the nucleic acid molecules of the present invention that do not encode a polypeptide having functional activity include, inter alia, (1) isolating a gene or allelic or splice variants thereof in a cDNA library; (2) in situ hybridization (e.g., "FISH") to metaphase chromosomal spreads to provide precise chromosomal location of the gene, as described in Verma et al., Human Chromosomes: A Manual of Basic Techniques, Pergamon Press, New York (1988); and (3) Northern Blot analysis for detecting mRNA expression in specific tissues.

Preferred, however, are nucleic acid molecules having sequences at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% identical to the nucleic acid sequences disclosed herein, which do, in fact, encode a polypeptide having a functional activity of a polypeptide of the invention.

Of course, due to the degeneracy of the genetic code, one of ordinary skill in the art will immediately recognize that a large number of the nucleic acid molecules having a sequence at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99%, or 100% identical to, for example, the nucleic acid sequence of the cDNA in the related cDNA clone contained in a

deposited library, the nucleic acid sequence referred to in Table 1 (SEQ ID NO:X), or fragments thereof, will encode polypeptides "having functional activity." In fact, since degenerate variants of any of these nucleotide sequences all encode the same polypeptide, in many instances, this will be clear to the skilled artisan even without performing the above described comparison assay. It will be further recognized in the art that, for such nucleic acid molecules that are not degenerate variants, a reasonable number will also encode a polypeptide having functional activity. This is because the skilled artisan is fully aware of amino acid substitutions that are either less likely or not likely to significantly effect protein function (e.g., replacing one aliphatic amino acid with a second aliphatic amino acid), as further described below.

For example, guidance concerning how to make phenotypically silent amino acid substitutions is provided in Bowie et al., "Deciphering the Message in Protein Sequences: Tolerance to Amino Acid Substitutions," Science 247:1306-1310 (1990), wherein the authors indicate that there are two main strategies for studying the tolerance of an amino acid sequence to change.

The first strategy exploits the tolerance of amino acid substitutions by natural selection during the process of evolution. By comparing amino acid sequences in different species, conserved amino acids can be identified. These conserved amino acids are likely important for protein function. In contrast, the amino acid positions where substitutions have been tolerated by natural selection indicates that these positions are not critical for protein function. Thus, positions tolerating amino acid substitution could be modified while still maintaining biological activity of the protein.

The second strategy uses genetic engineering to introduce amino acid changes at specific positions of a cloned gene to identify regions critical for protein function. For example, site directed mutagenesis or alanine-scanning mutagenesis (introduction of single alanine mutations at every residue in the molecule) can be used. (Cunningham and Wells, Science 244:1081-1085 (1989).) The resulting mutant molecules can then be tested for biological activity.

As the authors state, these two strategies have revealed that proteins are surprisingly tolerant of amino acid substitutions. The authors further indicate which amino acid changes are likely to be permissive at certain amino acid positions in the protein. For example, most buried (within the tertiary structure of the protein) amino acid residues require nonpolar side

chains. whereas few features of surface side chains are generally conserved. Moreover, tolerated conservative amino acid substitutions involve replacement of the aliphatic or hydrophobic amino acids Ala, Val, Leu and Ile; replacement of the hydroxyl residues Ser and Thr; replacement of the acidic residues Asp and Glu; replacement of the amide residues Asn and Gln. replacement of the basic residues Lys, Arg, and His; replacement of the aromatic residues Phe, Tyr, and Trp, and replacement of the small-sized amino acids Ala, Ser, Thr, Met, and Gly. Besides conservative amino acid substitution, variants of the present invention include (i) substitutions with one or more of the non-conserved amino acid residues, where the substituted amino acid residues may or may not be one encoded by the genetic code, or (ii) substitution with one or more of amino acid residues having a substituent group, or (iii) fusion of the mature polypeptide with another compound, such as a compound to increase the stability and/or solubility of the polypeptide (for example, polyethylene glycol), or (iv) fusion of the polypeptide with additional amino acids, such as, for example, an IgG Fc fusion region peptide, or leader or secretory sequence, or a sequence facilitating purification. Such variant polypeptides are deemed to be within the scope of those skilled in the art from the teachings herein.

For example, polypeptide variants containing amino acid substitutions of charged amino acids with other charged or neutral amino acids may produce proteins with improved characteristics, such as less aggregation. Aggregation of pharmaceutical formulations both reduces activity and increases clearance due to the aggregate's immunogenic activity. (Pinckard et al., Clin. Exp. Immunol. 2:331-340 (1967); Robbins et al., Diabetes 36: 838-845 (1987); Cleland et al., Crit. Rev. Therapeutic Drug Carrier Systems 10:307-377 (1993).)

A further embodiment of the invention relates to a polypeptide which comprises the amino acid sequence of a polypeptide having an amino acid sequence which contains at least one amino acid substitution, but not more than 50 amino acid substitutions, even more preferably, not more than 40 amino acid substitutions, still more preferably, not more than 30 amino acid substitutions, and still even more preferably, not more than 20 amino acid substitutions. Of course it is highly preferable for a polypeptide to have an amino acid sequence which comprises the amino acid sequence of a polypeptide of SEQ ID NO:Y, an amino acid sequence encoded by SEQ ID NO:X, and/or the amino acid sequence encoded by the cDNA in the related cDNA clone contained in a deposited library which contains, in order of ever-increasing preference, at least one, but not more than 10, 9, 8, 7, 6, 5, 4, 3, 2 or 1

amino acid substitutions. In specific embodiments, the number of additions, substitutions, and/or deletions in the amino acid sequence of SEQ ID NO:Y or fragments thereof (e.g., the mature form and/or other fragments described herein), an amino acid sequence encoded by SEQ ID NO:X or fragments thereof, and/or the amino acid sequence encoded by the cDNA in the related cDNA clone contained in a deposited library or fragments thereof, is 1-5, 5-10, 5-25, 5-50, 10-50 or 50-150, conservative amino acid substitutions are preferable.

Polynucleotide and Polypeptide Fragments

The present invention is also directed to polynucleotide fragments of the colon and/or colon cancer polynucleotides (nucleic acids) of the invention. In the present invention, a "polynucleotide fragment" refers, for example, to a polynucleotide having a nucleic acid sequence which: is a portion of the cDNA contained in a depostied cDNA clone; or is a portion of a polynucleotide sequence encoding the polypeptide encoded by the cDNA contained in a deposited cDNA clone; or is a portion of the polynucleotide sequence in SEQ ID NO:X or the complementary strand thereto; or is a polynucleotide sequence encoding a portion of the polypeptide of SEQ ID NO:Y; or is a polynucleotide sequence encoding a portion of a polypeptide encoded by SEQ ID NO:X or the complementary strand thereto. The nucleotide fragments of the invention are preferably at least about 15 nt, and more preferably at least about 20 nt, still more preferably at least about 30 nt, and even more preferably, at least about 40 nt, at least about 50 nt, at least about 75 nt, at least about 100 nt, at least about 125 nt or at least about 150 nt in length. A fragment "at least 20 nt in length," for example, is intended to include 20 or more contiguous bases from, for example, the sequence contained in the cDNA in a related cDNA clone contained in a deposited library, the nucleotide sequence shown in SEQ ID NO:X or the complementary stand thereto. In this context "about" includes the particularly recited value or a value larger or smaller by several (5, 4, 3, 2, or 1) nucleotides. These nucleotide fragments have uses that include, but are not limited to, as diagnostic probes and primers as discussed herein. Of course, larger fragments (e.g., at least 150, 175, 200, 250, 500, 600, 1000, or 2000 nucleotides in length) are also encompassed by the invention.

Moreover, representative examples of polynucleotide fragments of the invention, include, for example, fragments comprising, or alternatively consisting of, a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-

400, 401-450. 451-500, 501-550. 551-600, 651-700,701- 750. 751-800, 800-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100. 1101-1150, 1151-1200. 1201-1250, 1251-1300, 1301-1350. 1351-1400, 1401-1450, 1451-1500. 1501-1550, 1551-1600. 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900, 1901-1950, 1951-2000, 2001-2050, 2051-2100. 2101-2150, 2151-2200, 2201-2250, 2251-2300, 2301-2350, 2351-2400, 2401-2450, 2451-2500. 2501-2550, 2551-2600. 2601-2650, 2651-2700, 2701-2750, 2751-2800, 2801-2850, 2851-2900, 2901-2950, 2951-3000. 3001-3050, 3051-3100, 3101-3150, 3151-3200, 3201-3250, 3251-3300, 3301-3350, 3351-3400, 3401-3450, 3451-3500, 3501-3550, 3551-3600, 3601-3650, 3651-3700, 3701-3750, 3751-3800, 3801-3850, 3851-3900, 3901-3950, 3951-4000, 4001-4050, 4051-4100, and 4101 to the end of SEQ ID NO:X, or the complementary strand thereto. In this context "about" includes the particularly recited range or a range larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. Preferably, these fragments encode a polypeptide which has a functional activity (e.g., biological activity) of the polypeptide encoded by the polynucleotide of which the sequence is a portion. More preferably, these fragments can be used as probes or primers as discussed herein. Polynucleotides which hybridize to one or more of these nucleic acid molecules under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides or fragments.

Moreover, representative examples of polynucleotide fragments of the invention, include, for example, fragments comprising, or alternatively consisting of, a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600, 651-700,701- 750, 751-800, 800-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100, 1101-1150, 1151-1200, 1201-1250, 1251-1300, 1301-1350, 1351-1400, 1401-1450, 1451-1500, 1501-1550, 1551-1600, 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900, 1901-1950, 1951-2000, 2001-2050, 2051-2100, 2101-2150, 2151-2200, 2201-2250, 2251-2300, 2301-2350, 2351-2400, 2401-2450, 2451-2500, 2501-2550, 2551-2600, 2601-2650, 2651-2700, 2701-2750, 2751-2800, 2801-2850, 2851-2900, 2901-2950, 2951-3000. 3001-3050, 3051-3100, 3101-3150, 3151-3200. 3201-3250. 3251-3300, 3301-3350. 3351-3400, 3401-3450, 3451-3500, 3501-3550, 3551-3600, 3601-3650, 3651-3700, 3701-3750, 3751-3800, 3801-3850, 3851-3900, 3901-3950, 3951-4000, 4001-4050, 4051-4100, and 4101 to the end of the cDNA nucleotide

sequence contained in the deposited cDNA clone, or the complementary strand thereto. In this context "about" includes the particularly recited range, or a range larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. Preferably, these fragments encode a polypeptide which has a functional activity (e.g., biological activity) of the polypeptide encoded by the cDNA nucleotide sequence contained in the deposited cDNA clone. More preferably, these fragments can be used as probes or primers as discussed herein. Polynucleotides which hybridize to one or more of these fragments under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides or fragments.

In the present invention, a "polypeptide fragment" refers to an amino acid sequence which is a portion of that contained in SEQ ID NO:Y, a portion of an amino acid sequence encoded by the polynucleotide sequence of SEQ ID NO:X, and/or encoded by the cDNA contained in the related cDNA clone contained in a deposited library. Protein (polypeptide) fragments may be "free-standing," or comprised within a larger polypeptide of which the fragment forms a part or region, most preferably as a single continuous region. Representative examples of polypeptide fragments of the invention, include, for example, fragments comprising, or alternatively consisting of, an amino acid sequence from about amino acid number 1-20, 21-40, 41-60, 61-80, 81-100, 102-120, 121-140, 141-160, 161-180, 181-200, 201-220, 221-240, 241-260, 261-280, 281-300, 301-320, 321-340, 341-360, 361-380, 381-400, 401-420, 421-440, 441-460, 461-480, 481-500, 501-520, 521-540, 541-560, 561-580, 581-600, 601-620, 621-640, 641-660, 661-680, 681-700, 701-720, 721-740, 741-760, 761-780, 781-800, 801-820, 821-840, 841-860, 861-880, 881-900, 901-920, 921-940, 941-960, 961-980, 981-1000, 1001-1020, 1021-1040, 1041-1060, 1061-1080, 1081-1100, 1101-1120, 1121-1140, 1141-1160, 1161-1180, 1181-1200, 1201-1220, 1221-1240, 1241-1260, 1261-1280, 1281-1300, 1301-1320, 1321-1340, 1341-1360, and 1361 to the end of SEQ ID NO:Y. Moreover, polypeptide fragments of the invention may be at least about 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 100, 110, 120, 130, 140, or 150 amino acids in length. In this context "about" includes the particularly recited ranges or values, or ranges or values larger or smaller by several (5, 4, 3, 2, or 1) amino acids, at either terminus or at both termini. Polynucleotides encoding these polypeptide fragments are also encompassed by the invention.

Even if deletion of one or more amino acids from the N-terminus of a protein results in modification of loss of one or more biological functions of the protein, other functional activities (e.g., biological activities, ability to multimerize, ability to bind a ligand) may still be retained. For example. the ability of shortened muteins to induce and/or bind to antibodies which recognize the complete or mature forms of the polypeptides generally will be retained when less than the majority of the residues of the complete or mature polypeptide are removed from the N-terminus. Whether a particular polypeptide lacking N-terminal residues of a complete polypeptide retains such immunologic activities can readily be determined by routine methods described herein and otherwise known in the art. It is not unlikely that a mutein with a large number of deleted N-terminal amino acid residues may retain some biological or immunogenic activities. In fact, peptides composed of as few as six amino acid residues may often evoke an immune response.

Accordingly, polypeptide fragments of the invention include the secreted protein as well as the mature form. Further preferred polypeptide fragments include the secreted protein or the mature form having a continuous series of deleted residues from the amino or the carboxy terminus, or both. For example, any number of amino acids, ranging from 1-60, can be deleted from the amino terminus of either the secreted polypeptide or the mature form. Similarly, any number of amino acids, ranging from 1-30, can be deleted from the carboxy terminus of the secreted protein or mature form. Furthermore, any combination of the above amino and carboxy terminus deletions are preferred. Similarly, polynucleotides encoding these polypeptide fragments are also preferred.

The present invention further provides polypeptides having one or more residues deleted from the amino terminus of the amino acid sequence of a polypeptide disclosed herein (e.g., a polypeptide of SEQ ID NO:Y, a polypeptide encoded by the polynucleotide sequence contained in SEQ ID NO:X, and/or a polypeptide encoded by the cDNA contained in the related cDNA clone contained in a deposited library). In particular, N-terminal deletions may be described by the general formula m-q, where q is a whole integer representing the total number of amino acid residues in a polypeptide of the invention (e.g., the polypeptide disclosed in SEQ ID NO:Y), and m is defined as any integer ranging from 2 to q-6. Polynucleotides encoding these polypeptides are also encompassed by the invention.

Also as mentioned above, even if deletion of one or more amino acids from the C-terminus of a protein results in modification of loss of one or more biological functions of

the protein, other functional activities (e.g., biological activities, ability to multimerize, ability to bind a ligand) may still be retained. For example the ability of the shortened mutein to induce and/or bind to antibodies which recognize the complete or mature forms of the polypeptide generally will be retained when less than the majority of the residues of the complete or mature polypeptide are removed from the C-terminus. Whether a particular polypeptide lacking C-terminal residues of a complete polypeptide retains such immunologic activities can readily be determined by routine methods described herein and otherwise known in the art. It is not unlikely that a mutein with a large number of deleted C-terminal amino acid residues may retain some biological or immunogenic activities. In fact, peptides composed of as few as six amino acid residues may often evoke an immune response.

Accordingly, the present invention further provides polypeptides having one or more residues from the carboxy terminus of the amino acid sequence of a polypeptide disclosed herein (e.g., a polypeptide of SEQ ID NO:Y, a polypeptide encoded by the polynucleotide sequence contained in SEQ ID NO:X, and/or a polypeptide encoded by the cDNA contained in the related cDNA referenced in Table 1). In particular, C-terminal deletions may be described by the general formula 1-n, where n is any whole integer ranging from 6 to q-1, and where n corresponds to the position of an amino acid residue in a polypeptide of the invention. Polynucleotides encoding these polypeptides are also encompassed by the invention.

In addition, any of the above described N- or C-terminal deletions can be combined to produce a N- and C-terminal deleted polypeptide. The invention also provides polypeptides having one or more amino acids deleted from both the amino and the carboxyl termini, which may be described generally as having residues m-n of a polypeptide encoded by SEQ ID NO:X (e.g., including, but not limited to, the preferred polypeptide disclosed as SEQ ID NO:Y), and/or the cDNA in the related cDNA clone contained in a deposited library, where n and m are integers as described above. Polynucleotides encoding these polypeptides are also encompassed by the invention.

Any polypeptide sequence contained in the polypeptide of SEQ ID NO:Y, encoded by the polynucleotide sequences set forth as SEQ ID NO:X, or encoded by the cDNA in the related cDNA clone contained in a deposited library may be analyzed to determine certain preferred regions of the polypeptide. For example, the amino acid sequence of a polypeptide encoded by a polynucleotide sequence of SEQ ID NO:X, or the cDNA in a deposited cDNA

clone may be analyzed using the default parameters of the DNASTAR computer algorithm (DNASTAR. Inc., 1228 S. Park St.. Madison, WI 53715 USA; http://www.dnastar.com/).

Polypeptide regions that may be routinely obtained using the DNASTAR computer algorithm include, but are not limited to, Garnier-Robson alpha-regions, beta-regions, turn-regions. and coil-regions, Chou-Fasman alpha-regions, beta-regions, and turn-regions, Kyte-Doolittle hydrophilic regions and hydrophobic regions, Eisenberg alpha- and beta-amphipathic regions, Karplus-Schulz flexible regions, Emini surface-forming regions and Jameson-Wolf regions of high antigenic index. Among highly preferred polynucleotides of the invention in this regard are those that encode polypeptides comprising regions that combine several structural features, such as several (e.g., 1, 2, 3 or 4) of the features set out above.

Additionally, Kyte-Doolittle hydrophilic regions and hydrophobic regions. Emini surface-forming regions, and Jameson-Wolf regions of high antigenic index (i.e., containing four or more contiguous amino acids having an antigenic index of greater than or equal to 1.5, as identified using the default parameters of the Jameson-Wolf program) can routinely be used to determine polypeptide regions that exhibit a high degree of potential for antigenicity. Regions of high antigenicity are determined from data by DNASTAR analysis by choosing values which represent regions of the polypeptide which are likely to be exposed on the surface of the polypeptide in an environment in which antigen recognition may occur in the process of initiation of an immune response.

Preferred polypeptide fragments of the invention are fragments comprising, or alternatively consisting of, an amino acid sequence that displays a functional activity of the polypeptide sequence of which the amino acid sequence is a fragment.

By a polypeptide demonstrating a "functional activity" is meant, a polypeptide capable of displaying one or more known functional activities associated with a full-length (complete) protein of the invention. Such functional activities include, but are not limited to, biological activity, antigenicity [ability to bind (or compete with a polypeptide for binding) to an anti-polypeptide antibody], immunogenicity (ability to generate antibody which binds to a specific polypeptide of the invention), ability to form multimers with polypeptides of the invention. and ability to bind to a receptor or ligand for a polypeptide.

Other preferred polypeptide fragments are biologically active fragments. Biologically active fragments are those exhibiting activity similar, but not necessarily identical, to an

activity of the polypeptide of the present invention. The biological activity of the fragments may include an improved desired activity, or a decreased undesirable activity.

In preferred embodiments, polypeptides of the invention comprise, or alternatively consist of, one, two, three, four, five or more of the antigenic fragments of the polypeptide of SEQ ID NO:Y, or portions thereof. Polynucleotides encoding these polypeptides are also encompassed by the invention.

Table 4.

Sequence/ Contig ID	Predicted Epitopes
500802	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 774 as residues: Gln-1 to Ser-17. Ser-19 to Ile-25. Leu-29 to Arg-41. Ser-46 to Glu-57.
553147	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 776 as residues: Phe-1 to Ile-20.
558860	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 777 as residues: Ser-6 to Arg-11.
561730	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 778 as residues: Asn-1 to Arg-7. Leu-28 to Pro-45.
585938	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 779 as residues: Arg-10 to Ser-23. Gln-69 to His-74.
587785	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 780 as residues: Ile-1 to Ser-11. Leu-20 to Thr-30. Cys-74 to Cys-82. Leu-94 to Glu-110.
588916	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 781 as residues: Val-43 to Pro-55. Glu-92 to Ser-99.
613825	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 782 as residues: Asn-1 to Trp-11. Ser-15 to Gln-22. Ser-43 to Ala-51. Lys-58 to Gly-66.
639090	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 783 as residues: Ser-29 to Ser-35. Pro-43 to Gly-48. Gln-60 to Ser-65.
659544	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 785 as residues: Leu-10 to Glu-15. His-19 to Glu-26.
659739	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 786 as residues: Lys-70 to His-78, Lys-149 to Asn-154, Gly-209 to Leu-217. Lys-248 to Val-255, Ile-259 to Arg-264. Arg-280 to Ala-287.
661057	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 787 as residues: Cys-59 to Arg-64. Gly-110 to Asp-115. Pro-127 to Trp-132.
661313	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 788 as residues: Glu-1 to Phe-7. Lys-42 to Leu-48.
666316	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 789 as residues: Lys-27 to Asn-52.
669229	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 790 as residues: Asp-1 to Phe-12. Val-92 to Ser-103.
670471	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 791 as residues: Lys-75 to Asp-81, Glu-145 to Gln-156. Glu-163 to Arg-170. Lys-225 to Leu-231.
676611	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 792 as residues: Tyr-4 to Lys-12. Thr-23 to Asn-31. Val-52 to Thr-63. Arg-90 to Met-95.
691240	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 793 as residues: Pro-74 to Glu-79. Ser-116 to Lys-121.
702977	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 794 as residues: Pro-8 to Tyr-20.
709517	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 795 as residues: Leu-7 to Gly-12. Cys-20 to His-27.
714730	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 796 as residues: Pro-14 to Arg-23. Ala-171 to Ser-178.
714834	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 797 as residues: Ala-6 to Gly-12. Gln-18 to Arg-32.
719584	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 799 as residues: Pro-22 to Ile-31.
724637	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 800 as residues: Val-11 to Arg-34. Asn-54 to Cys-59.
728392	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 801 as

	residues: Arg-31 to Glu-45. Gly-76 to Pro-88. Asn-143 to Asp-148.
738716	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 802 as residues: Pro-40 to Pro-46.
739056	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 803 as residues: Ser-28 to Ala-33. Pro-44 to Phe-49, Arg-113 to Gly-118. Pro-131 to Arg-142. Asp-155 to Leu-166.
739143	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 804 as residues: Ala-1 to Gly-14. Glu-21 to Gly-27. Asp-54 to Lys-59. Lys-64 to Glu-71. Gln-92 to Leu-97. Asn-114 to His-120. Leu-135 to Asp-142. Glu-149 to Ser-154. Ser-256 to Thr-261. Asp-290 to Lys-301. Glu-315 to Gln-323, Lys-331 to Asn-342. Arg-346 to Met-361.
742329	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 805 as residues: Arg-7 to Ala-13. Gln-21 to Ser-27. Gln-68 to Gly-73. Pro-75 to Val-88.
745481	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 807 as residues: Asn-1 to Lys-14. Arg-32 to His-39. Asn-46 to Gly-51.
753731	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 809 as residues: Arg-22 to Ser-39. Val-42 to Thr-54. Gln-61 to His-69.
754383	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 810 as residues: Ala-2 to Gly-12.
756749	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 811 as residues: His-1 to Thr-11. Thr-13 to Ser-18. Gly-25 to Gly-30. Pro-63 to Pro-69. Glu-84 to Tyr-101. Asn-110 to Ala-140.
757980	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 812 as residues: Phe-9 to His-21.
764818	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 813 as residues: Pro-12 to Trp-17, Asn-22 to Ala-37. Arg-45 to Gly-54, Asp-72 to Thr-95. Pro-97 to Glu-116. Gly-137 to Lys-151. Glu-164 to Asp-171, Ser-175 to Gly-185. Glu-187 to Gly-213. Lys-270 to Glu-276, Leu-281 to Lys-286. Asp-314 to Gly-321. Glu-324 to Glu-331. Val-333 to Arg-340.
765140	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 814 as residues: Thr-15 to Asp-27.
766893	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 815 as residues: Arg-6 to Leu-11. Arg-21 to Tyr-27. Phe-37 to Lys-46. Gly-59 to Gly-64.
771412	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 817 as residues: Pro-1 to His-6. Pro-37 to Arg-47.
772226	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 818 as residues: Phe-16 to Arg-30. Glu-35 to Trp-58. Lys-60 to Gln-68. Pro-80 to Tyr-85.
773057	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 819 as residues: Gly-37 to Arg-43.
773173	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 820 as residues: Pro-19 to Asn-26.
780154	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 821 as residues: Arg-20 to Ile-31, Pro-34 to Ala-59, Glu-66 to Pro-125, Leu-132 to Lys-137, Lys-155 to Arg-259.
780768	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 822 as residues: Phe-12 to Lys-17.
780779	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 823 as residues: Ser-1 to Ser-11. Gln-64 to Gln-69. Arg-117 to Arg-127.
782394	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 824 as residues: Phe-18 to Gly-24.
783160	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 825 as residues: Lys-35 to Lys-41. Thr-50 to His-56. Thr-110 to Gly-119.
783506	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 826 as residues: Thr-3 to Thr-9.
792139	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 830 as residues: Arg-1 to Thr-13. Arg-21 to Pro-30. Ser-70 to Arg-79. Asp-89 to Arg-101.

805715	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 832 as residues: Met-7 to Ala-17, Arg-26 to Leu-32, Lys-47 to Lys-52, Asn-67 to Asn-72, Val-77 to Tyr-82, Pro-101 to Arg-107, Arg-137 to Arg-146, Ser-168 to Thr-173, Asp-189 to Lys-199.
811111	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 833 as residues: His-24 to Asn-31.
811113	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 834 as residues: Gln-1 to Ala-9, Cys-56 to Gly-61, Trp-105 to Thr-110, Arg-150 to Thr-155, Leu-189 to Lys-195.
823902	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 835 as residues: Thr-18 to Glu-23.
826518	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 836 as residues: Ile-20 to Lys-26, Cys-39 to Arg-46.
826704	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 837 as residues: His-14 to Phe-20, Glu-70 to Leu-83.
828180	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 840 as residues: Glu-38 to Arg-52, Ser-56 to Val-62.
828658	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 842 as residues: Asp-1 to Pro-12, Gly-59 to Lys-64, Asp-70 to Leu-76, Pro-160 to Pro-166, Thr-174 to Asn-179.
828919	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 843 as residues: Thr-49 to Val-54, Leu-83 to Lys-91, Gly-121 to Thr-130, Asp-165 to Glu-172, Thr-180 to Gly-188.
830208	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 846 as residues: Lys-49 to Asn-56, Glu-61 to Ala-67.
830248	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 847 as residues: Pro-17 to Asp-36, Pro-102 to Glu-108, Pro-122 to Lys-128, His-150 to Gly-155, Asn-162 to Tyr-168, Pro-186 to Gln-193, Ser-205 to Pro-211, Gln-305 to Gly-317.
830275	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 848 as residues: Ser-16 to Glu-22, Asn-45 to Ser-50, Thr-121 to Gly-136, Lys-150 to Arg-157, Ser-175 to Cys-181, Gly-198 to Ser-203.
830286	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 849 as residues: His-11 to Pro-18, Thr-241 to Thr-258, Ala-352 to Ala-365.
830347	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 850 as residues: Asp-33 to Ala-39.
830348	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 851 as residues: Gln-5 to Arg-15, Ile-96 to Asn-101, Asp-122 to Gly-128.
830364	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 852 as residues: Val-76 to Asn-82, Lys-87 to Tyr-94, Glu-118 to Gln-125, Pro-140 to Ile-145, Gly-149 to Pro-173, Ala-215 to Lys-222, Lys-230 to Gly-235, Pro-250 to Asn-256, Ser-302 to Arg-307, Ser-321 to Glu-332.
830394	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 853 as residues: Thr-37 to Thr-44, Leu-57 to Ser-63, Ser-74 to Lys-86, Gln-107 to Leu-112, Lys-140 to Ala-145, Asp-154 to Ser-163.
830412	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 855 as residues: His-65 to Gly-74, Asp-85 to Ser-97, Leu-133 to Glu-138, Glu-144 to Asp-153, Arg-170 to Ser-175, Gly-184 to Arg-189, Gln-202 to Tyr-208.
830464	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 857 as residues: Val-3 to Val-11, Gln-16 to Gln-27, Glu-41 to Asp-51.
830471	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 858 as residues: Glu-10 to His-22, Ser-37 to Lys-45.
830477	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 859 as residues: Lys-1 to Cys-13, Thr-32 to Cys-37, Ser-44 to Glu-50, Glu-57 to Asn-64, Glu-85 to Glu-93, Ala-129 to Ser-139, Gln-157 to Thr-185, Gln-199 to Gly-215, Ile-241 to Leu-247, Asp-254 to Leu-263, Gln-265 to Gln-270, Glu-298 to Gln-309, Glu-316 to Ala-321, Leu-325 to Glu-334, Glu-340 to Ser-345, Leu-348 to His-367, Lys-384 to Arg-391.

	Leu-409 to Asn-417, Arg-431 to Arg-437. Phe-441 to Leu-448. Ala-456 to Glu-484. Lys-509 to Val-519. Glu-521 to Asp-528. Asp-546 to Phe-553. Glu-558 to Phe-567. Pro-573 to Thr-588.
830500	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 860 as residues: Gln-27 to Gly-34.
830509	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 861 as residues: Pro-2 to Asp-7. Gln-13 to Gln-29. Pro-35 to Trp-41.
830528	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 862 as residues: Gln-1 to Arg-12, Asp-22 to Pro-44. Lys-52 to Asp-62, Pro-68 to Lys-93. Pro-99 to Pro-129. Ala-138 to Ser-150. Lys-156 to Val-194. Ile-197 to Glu-210. Ala-213 to Ala-287. Leu-289 to Lys-327. Lys-330 to Gly-340, Asp-344 to Gln-360. Ile-396 to Thr-401. Lys-409 to Asp-418. Met-450 to Ala-460. Glu-468 to Gly-475.
830542	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 863 as residues: Val-1 to Gly-10, Arg-24 to Asp-36. Leu-225 to Trp-231, Val-249 to Met-258. Glu-262 to Thr-269. Val-279 to Gly-284. Asp-307 to Asn-313. Arg-411 to Lys-416.
830564	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 864 as residues: Trp-103 to Glu-113. Lys-118 to Tyr-125.
830611	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 865 as residues: Glu-51 to Ser-57. Arg-128 to Ala-133.
830620	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 867 as residues: Lys-54 to Arg-59. Arg-66 to Arg-71.
830630	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 868 as residues: Pro-12 to Gly-17.
830654	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 869 as residues: Leu-1 to Asp-6.
830660	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 870 as residues: Lys-111 to Trp-116. Glu-139 to Gly-148. Arg-182 to Ser-189.
830704	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 872 as residues: Asn-1 to Glu-8, Ala-38 to Gly-46, Gln-58 to Asp-71, Ala-75 to Cys-103. Met-106 to Ala-140. Gln-153 to Ile-159.
830765	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 873 as residues: Ser-19 to Thr-26. Pro-47 to Thr-59.
830778	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 874 as residues: Asp-35 to Gly-40. Glu-104 to Glu-109. Ser-226 to Tyr-231.
830784	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 875 as residues: Pro-34 to Leu-41.
830800	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 876 as residues: Ser-16 to Lys-24, Gly-91 to Thr-96.
830821	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 877 as residues: Leu-2 to Thr-8, Asp-15 to Gly-26, Phe-64 to Ser-70, Pro-77 to Trp-82, Pro-85 to Lys-90.
830849	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 878 as residues: Leu-2 to Ser-18. Gly-31 to Ser-40. Asn-56 to Thr-86. Asp-114 to Arg-120.
830903	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 879 as residues: Thr-21 to Thr-33.
830913	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 880 as residues: Gly-48 to Pro-53. Gln-66 to Pro-74. Thr-151 to Gly-156. Asn-292 to Asn-297.
830920	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 881 as residues: Asp-15 to Ser-25, Ser-33 to Val-38. Lys-181 to Phe-187.
830938	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 882 as residues: Thr-65 to Asp-70. Leu-89 to Ala-95.
831014	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 884 as residues: Ala-2 to Gln-11, Glu-71 to Leu-78, Leu-89 to Trp-98, Ser-163 to Ala-170, Glu-261 to Asp-269. Phe-286 to Val-292.
831026	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 885 as residues: Lys-41 to Gly-46. Tyr-64 to Phe-75.

831055	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 887 as residues: Trp-37 to His-50. Lys-108 to Phe-114. Lys-131 to Thr-137. Arg-351 to Ser-356. Pro-363 to Cys-369. Glu-390 to Asp-397.
831057	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 888 as residues: Arg-1 to Gly-14. Thr-19 to Gly-25. Ala-31 to Ala-41. Glu-53 to Ile-62. Val-66 to Glu-75. Ser-103 to Asp-113. Ala-135 to Asp-140.
831062	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 889 as residues: Ser-24 to Ala-31.
831117	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 890 as residues: Lys-50 to Tyr-55.
831122	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 891 as residues: Phe-8 to Gly-14. Arg-58 to Gly-68. Lys-107 to Ser-131. Gln-151 to Val-160, Lys-180 to Lys-186. Lys-211 to Thr-223.
831132	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 893 as residues: Gly-1 to Ser-16.
831152	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 894 as residues: Ser-8 to Arg-13, Lys-59 to Ala-65. Glu-71 to Glu-86. Leu-98 to His-108. Arg-118 to Ile-126. His-138 to Ala-145. Pro-148 to Tyr-156. Pro-170 to Ala-175. Val-187 to Lys-194. Glu-206 to Val-217. Gly-221 to Ser-226. Asp-250 to Lys-255.
831157	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 895 as residues: Val-1 to Asn-11, Glu-13 to Gly-25. Ser-31 to Ala-49. Arg-61 to Gly-66. Ala-84 to Ala-90.
831160	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 896 as residues: His-1 to Ala-7, Asp-43 to Lys-52, Tyr-98 to Gly-103. Glu-118 to Leu-125. Phe-183 to Tyr-195. Gln-209 to Arg-220. Ile-257 to Gly-262. Glu-278 to Thr-284. Ile-309 to Pro-314. Leu-339 to Asp-347. Ala-358 to Gln-388, Gln-401 to Leu-414. Glu-425 to Ala-440. Ala-448 to Glu-453. Ile-460 to Gln-465. Glu-482 to Glu-492. Ala-498 to Glu-511. Pro-520 to Val-526, Gly-556 to Gln-577, Leu-587 to His-598. Glu-605 to Asp-630.
831197	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 898 as residues: Ser-28 to Leu-39. Phe-48 to Phe-55. Pro-60 to Gln-66. Arg-73 to Thr-78.
831217	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 899 as residues: Asp-52 to Val-63. Asn-75 to Glu-83.
831248	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 901 as residues: Pro-24 to Gly-34. Lys-108 to Arg-118.
831369	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 903 as residues: Ala-1 to Gly-8.
831371	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 904 as residues: Arg-39 to Ser-44. Arg-66 to Arg-76.
831373	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 905 as residues: Gly-7 to Ser-13, Gln-40 to Trp-45, Lys-109 to Gly-116. Gly-134 to Arg-141, Arg-149 to Arg-164, Arg-174 to Phe-181, Lys-202 to Lys-210, Glu-263 to Leu-272, Pro-274 to Leu-280, Glu-289 to Glu-296, Pro-334 to His-341. Tyr-413 to Pro-426, Glu-432 to Lys-449.
831387	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 906 as residues: Tyr-21 to Leu-28. Cys-51 to Phe-72, Ser-107 to Leu-113. Leu-125 to Leu-134, Ser-142 to Ala-152. His-159 to Tyr-164. Arg-276 to Val-290.
831410	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 907 as residues: Arg-7 to Lys-13. Pro-28 to Cys-34. Gly-100 to Asn-109. Cys-155 to Arg-162.
831448	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 908 as residues: Ala-10 to Cys-20, Tyr-36 to Lys-41, Asp-68 to Ala-75. Ala-84 to Arg-89. Glu-112 to Ser-119.
831450	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 909 as residues: Pro-23 to Gly-28. Thr-52 to Pro-63.
831472	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 910 as residues: Ser-16 to Ala-26.

831473	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 911 as residues: Arg-37 to Gln-42, Asn-59 to Asn-65, Asn-109 to Val-121, Arg-191 to Glu-199, Lys-205 to Ile-214.
831474	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 912 as residues: Glu-1 to Leu-8, Ser-50 to Arg-56, Thr-61 to Arg-66, Val-69 to Arg-82.
831494	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 913 as residues: Arg-21 to Ser-27, Arg-77 to Asp-82, Glu-116 to Ile-134, Ser-139 to Ser-162, Leu-167 to Gly-190, Cys-192 to Gly-205.
831506	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 914 as residues: Val-6 to Tyr-12, Lys-77 to Ala-82, Ser-102 to Arg-108, Ser-145 to Ser-151.
831533	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 915 as residues: Thr-9 to Cys-16, Arg-52 to Tyr-57, Ser-61 to Ser-69.
831539	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 916 as residues: Thr-32 to Arg-39, Cys-44 to Arg-60, Lys-65 to Gln-70, Gly-78 to Ile-86, Lys-126 to Thr-134, Leu-140 to Glu-148.
831556	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 917 as residues: Gly-45 to Asp-52.
831598	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 919 as residues: Asn-1 to Val-6, Phe-76 to Tyr-83, Gly-129 to Gln-135, Thr-145 to Asp-153, Pro-213 to Gln-220, Thr-230 to Asn-236, Lys-242 to Ala-248.
831608	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 920 as residues: Thr-23 to Pro-34, Glu-39 to Asp-83, Asn-89 to Lys-99, Asp-118 to Asp-128, Asn-135 to Glu-150, Glu-153 to Gly-168, Gly-181 to Thr-187, Arg-200 to Asp-205, Arg-273 to Ile-279, Thr-295 to Asp-300, Thr-316 to Cys-321.
831613	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 921 as residues: Pro-1 to Glu-7, Arg-9 to Phe-15, Thr-27 to Gly-34.
831655	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 926 as residues: Tyr-31 to Gln-38.
831708	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 927 as residues: Glu-22 to Ile-27, Gly-43 to Gly-49, His-83 to Arg-105.
831741	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 929 as residues: Asp-22 to Asp-27, Pro-64 to Gln-74, Ser-126 to Gly-131, Lys-134 to Arg-143, Arg-150 to Gly-162, Gln-180 to Tyr-196, Asp-209 to Leu-224, Gly-233 to Gly-241, Pro-246 to Arg-251.
831754	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 930 as residues: Arg-40 to Glu-50, Gly-57 to Gly-68, Phe-72 to Tyr-79.
831760	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 931 as residues: His-24 to Asp-39.
831780	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 932 as residues: Arg-92 to Thr-101.
831796	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 933 as residues: Pro-1 to Ser-8.
831800	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 934 as residues: Asp-1 to Ser-6, Glu-16 to Ser-26, Lys-66 to Pro-76, Leu-93 to Arg-99, Val-153 to Lys-164, Glu-177 to Asp-183, Ser-188 to Leu-193, Arg-210 to Ser-220, Thr-229 to Ser-244, Pro-283 to Phe-297.
831813	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 937 as residues: Pro-20 to Ala-30.
831830	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 938 as residues: Arg-12 to Lys-17, Gln-51 to Phe-60, Asp-97 to Trp-102, Glu-132 to Cys-137, Asp-160 to Leu-168, Glu-210 to Gln-219, Lys-302 to Pro-308, Phe-416 to Asp-421, Leu-444 to Leu-449, Val-457 to Asn-464, Leu-466 to Trp-472, Ile-474 to Trp-480, Ser-527 to Ser-533, Pro-558 to Phe-565, Ile-578 to Trp-584, Asp-614 to Asp-627, Asn-698 to Asp-710, Pro-738 to Ser-744.
831860	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 939 as residues: Pro-19 to Tyr-25.

831896	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 941 as residues: Ser-18 to Phe-30, Leu-34 to Asn-41, Ala-48 to Tyr-56, Leu-103 to Ala-110, Asp-124 to Val-130, Ile-141 to Leu-150, Leu-188 to Ser-196, Glu-229 to Asn-238, Thr-248 to Cys-259.
831928	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 942 as residues: Asn-55 to Asp-60.
831949	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 943 as residues: Arg-1 to Glu-9, Glu-19 to Arg-32, Ala-77 to Thr-90, Thr-95 to Thr-104, Lys-106 to Ser-119, Leu-136 to Arg-141, Tyr-165 to Asn-174.
831950	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 944 as residues: Ser-18 to Glu-26, Phe-93 to Arg-102, Leu-137 to Gln-143, Pro-148 to Gly-157.
831975	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 946 as residues: His-41 to Thr-48.
832047	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 948 as residues: Arg-57 to Glu-62, Pro-73 to Gly-80.
832078	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 949 as residues: Pro-14 to Leu-21, Cys-34 to Gly-39.
832100	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 950 as residues: Tyr-37 to Val-45.
832104	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 951 as residues: Thr-1 to Ser-6, Arg-14 to Cys-20.
832279	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 954 as residues: Ser-28 to Pro-34, Pro-134 to Ser-139, Gln-178 to Gly-183, Thr-193 to Gly-198, His-244 to Gly-257, Asp-263 to Tyr-273, Lys-337 to Arg-347, Pro-366 to Lys-372, Ala-382 to Asp-387.
832317	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 955 as residues: Thr-32 to Gln-39, Asn-58 to Trp-71, Glu-96 to Trp-108, Cys-126 to Gly-133.
832364	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 957 as residues: Glu-2 to Met-9, Asp-17 to Asn-22, Leu-27 to Val-35.
832428	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 960 as residues: Arg-35 to Gly-41.
832485	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 961 as residues: Ser-121 to Cys-127.
832494	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 962 as residues: Ser-10 to Leu-28, Ser-31 to Asp-40, Ser-55 to Thr-62, Thr-94 to Asn-102, Asp-124 to Phe-135, Asn-175 to Lys-193, Glu-238 to Leu-243, Val-250 to Ala-259, Lys-291 to Asn-308, Ser-318 to Gly-327, Lys-335 to Asp-346, Tyr-404 to Ile-410, Gln-420 to Gln-430, Thr-476 to Phe-482, Pro-536 to Val-561, Tyr-563 to Leu-568.
832512	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 963 as residues: Arg-1 to Ala-7, Leu-9 to Ser-24, Glu-32 to Asp-43, Glu-71 to Glu-86, Val-92 to Ile-104, Asp-143 to Ser-154, Lys-190 to Glu-202, Glu-218 to Lys-241.
832515	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 964 as residues: Glu-3 to Gly-12, Arg-20 to Gln-30, Leu-34 to Gln-39, Asp-51 to Arg-58, Gln-69 to Val-77, Gly-105 to Lys-117, Cys-123 to Phe-132.
832526	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 965 as residues: Pro-15 to Asn-25, Glu-48 to Phe-59.
832575	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 966 as residues: Thr-24 to Arg-29, Ala-55 to Tyr-60, Tyr-77 to Asp-89, Leu-108 to Gly-115, Thr-142 to Gly-149.
832576	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 967 as residues: Arg-1 to Leu-11, Pro-21 to Gly-28, Pro-37 to His-47, Lys-79 to Gln-88, Pro-108 to Gly-116, Pro-179 to Thr-188, Arg-207 to Asn-213.
832634	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 969 as residues: Leu-2 to Ser-12, Pro-125 to Asp-133.
832728	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 970 as residues: Gln-16 to Gly-32, Leu-100 to Gly-106, Gly-118 to Lys-132, Pro-156 to Leu-

	162.
833395	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 972 as residues: Ser-3 to Gly-9.
834326	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 973 as residues: Ser-1 to Trp-19. Asn-148 to Leu-153. Tyr-235 to Trp-244.
834944	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 975 as residues: Glu-42 to Gln-51. Pro-115 to Asp-120. Arg-127 to Gly-133. Gln-199 to Gln-211.
835104	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 977 as residues: Thr-1 to Arg-14. Val-18 to Pro-23. Thr-37 to Met-44. Gln-51 to Leu-57.
835332	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 978 as residues: Thr-1 to Glu-13. Arg-135 to Asp-142. Thr-150 to Gln-155. Cys-173 to Cys-183. Cys-203 to Asp-214.
835487	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 979 as residues: Ala-13 to Arg-22. Pro-43 to Glu-57. Ala-73 to Pro-90, Arg-102 to Ser-109. Pro-114 to Gly-122, Arg-127 to Arg-138, Glu-153 to Gly-158. Pro-165 to Pro-171. Gly-185 to Arg-190. Pro-211 to Pro-216. Glu-231 to Asn-261. Ala-280 to Pro-291. Pro-303 to Gly-311. Arg-313 to Gly-326, Ala-358 to Ala-364. Pro-369 to Gly-377. Pro-390 to Gly-407. Tyr-420 to Tyr-441. Glu-461 to Thr-470. Pro-479 to Trp-487, Asp-489 to Cys-494. Gln-515 to Lys-532. Ala-572 to Asn-582. Asp-588 to Leu-594. Cys-625 to Trp-632. Tyr-639 to Arg-646.
836182	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 980 as residues: Ala-7 to Thr-17. Arg-31 to Thr-36.
836522	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 981 as residues: Gly-59 to Cys-65.
836789	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 984 as residues: Gly-18 to Gly-25. Glu-59 to Glu-64.
838577	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 985 as residues: Pro-15 to Trp-20. Pro-46 to Gln-57. Glu-68 to Phe-83.
839008	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 987 as residues: Arg-1 to Arg-13, Gln-125 to Glu-131. Asn-137 to Val-142, Gly-183 to Tyr-188. Asn-245 to Ser-251. Gln-302 to Asn-311.
840063	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 988 as residues: Gly-1 to Gly-31.
840533	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 989 as residues: Thr-16 to Pro-23. Pro-39 to Trp-48. Arg-50 to Lys-55. Gly-73 to Gly-79.
840669	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 990 as residues: Met-27 to Gln-33, Gln-49 to Gly-56, Thr-63 to Leu-70, Thr-115 to Arg-127, Pro-174 to Asn-184.
841140	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 991 as residues: Arg-17 to Phe-24, Pro-113 to Gly-121. Thr-235 to Met-240.
841386	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 992 as residues: Val-58 to Met-66, Pro-134 to Lys-143, Tyr-163 to Ala-170. Val-178 to Lys-187. Pro-207 to Gly-212.
841900	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 996 as residues: Ile-2 to Phe-12.
842054	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 997 as residues: Asp-27 to Trp-32. Pro-89 to Glu-99. Arg-112 to Lys-123.
843061	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 998 as residues: Leu-3 to Gly-18, His-36 to His-57, Lys-136 to Leu-145. Gly-174 to Trp-184, Lys-188 to Tyr-196, Lys-204 to Asp-211, Pro-293 to Ser-305. Glu-321 to Asp-333. Gly-342 to Lys-348. Ala-371 to Asp-377. Asp-439 to Leu-449. Ala-521 to Gly-529. Tyr-583 to Trp-599. Asn-639 to Ser-644. Leu-738 to Leu-745.
843544	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 999 as residues: Tyr-11 to Phe-18. Ser-34 to Lys-43.
844092	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1000 as

	residues: Gln-1 to Lys-6. Glu-30 to Glu-37. Glu-40 to Thr-53.
844270	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1001 as residues: Thr-10 to Gly-20. Pro-44 to Thr-50.
844604	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1002 as residues: Gly-8 to Phe-20. Pro-23 to Arg-43. Asp-62 to Asp-67. Pro-73 to Asn-80. Val-83 to Phe-95. Glu-103 to Ile-109. Tyr-120 to Ala-125. Thr-176 to Thr-183. Pro-200 to Pro-214. Pro-232 to Met-240. Gln-248 to Asp-292. Arg-297 to Ser-310. Pro-320 to Glu-332. Glu-347 to Ser-390. Ala-392 to Pro-404. Pro-425 to Gly-435. Pro-438 to Gly-443. Gly-467 to Pro-480, Pro-486 to Pro-499. Pro-506 to Met-512. Pro-572 to Glu-580, Arg-592 to Gly-597. Ala-601 to Ser-610. Ala-618 to Pro-623.
844685	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1003 as residues: Ser-14 to Ser-19. Pro-25 to Gly-32. Asn-98 to Lys-108.
844855	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1004 as residues: Ala-9 to Ser-15. Pro-21 to Arg-26.
845101	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1005 as residues: Ala-2 to Gly-13. Pro-31 to Pro-42. Gln-89 to Tyr-95. Gln-169 to Leu-189.
845141	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1006 as residues: Gly-13 to Met-26. Arg-34 to Gly-39. Ile-60 to Ser-80. Ala-85 to Thr-98.
845220	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1007 as residues: Pro-14 to Gly-24. Glu-33 to Ala-39. Asp-145 to Pro-168. Ala-238 to Arg-250. Pro-258 to Phe-269. Arg-285 to Pro-290. Ala-340 to Cys-364.
845434	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1008 as residues: Ala-1 to Glu-7, Gln-29 to Phe-34, Gly-67 to Ala-75, Gln-78 to Leu-83, Asn-96 to Ile-109. Thr-144 to Trp-151.
845510	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1009 as residues: Arg-79 to Leu-86. Met-114 to Asp-122. Leu-129 to Leu-134, Gln-145 to Arg-152.
845600	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1010 as residues: Ala-22 to Phe-28.
845882	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1011 as residues: Ala-1 to Gly-7, Arg-29 to Lys-35. Lys-72 to Ala-79. Leu-94 to Val-101, Gly-137 to Asn-142, Arg-145 to Leu-150. Gly-180 to Lys-187, Glu-194 to Gly-208, Arg-257 to Ser-267. Ser-278 to Asp-290, Gly-312 to Ser-319. Leu-338 to Lys-351. Tyr-358 to Ser-363.
846007	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1012 as residues: Tyr-16 to Ala-24, Arg-59 to Ser-66. Thr-78 to Glu-83. Glu-90 to Ser-103. Gln-108 to Thr-113. Ser-115 to Cys-124.
HCRNG17R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1016 as residues: Pro-16 to Asp-21.
HWMFG64R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1017 as residues: Ser-70 to Asp-76. Lys-87 to Leu-95.
HAGCZ94R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1018 as residues: Val-3 to Lys-9.
HBJEJ74R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1019 as residues: Pro-1 to Asp-8.
HUTHM43R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1021 as residues: Pro-7 to Arg-15.
HLTGU75R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1022 as residues: Ser-1 to Gly-11.
HWLKF77R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1023 as residues: Leu-10 to Asn-28.
HWLGX29R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1027 as residues: Val-3 to Ile-10. Pro-34 to Gln-40.
HWMFZ29R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1028 as residues: Leu-7 to Leu-13.
H6EEP19R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1030 as

	residues: Ala-1 to Trp-8, Lys-10 to Asp-27.
HJMAM83R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1031 as residues: Ser-1 to Val-11, Glu-19 to Ala-29, Asp-52 to Ala-68, Gly-78 to Lys-94.
HAGHF58R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1032 as residues: Lys-1 to Val-7.
HDPHG48R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1033 as residues: Gly-24 to Lys-34.
HCDMC32R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1038 as residues: Pro-2 to Arg-17, Lys-36 to Pro-47, Phe-61 to Trp-68, Gln-72 to Ala-86.
HTEQO80R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1040 as residues: Gly-1 to Val-15, Pro-17 to Pro-23, Leu-32 to Met-41, Lys-102 to His-109.
H2LAR08R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1043 as residues: Asn-58 to Gly-64.
HWMFN58R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1046 as residues: Glu-6 to Asn-14, Arg-22 to Asp-31, Gly-49 to Thr-56.
HUFBP63R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1049 as residues: Pro-1 to Gln-8, Thr-57 to Gly-64, Arg-69 to Arg-74, Gly-80 to Asp-91, Asp-105 to Gln-110, Arg-130 to Tyr-148.
HUFBN90R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1050 as residues: Glu-34 to Ala-40, Arg-111 to Ala-116.
HFKHD61R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1054 as residues: Arg-11 to Gly-38, Arg-44 to Glu-50, Gln-53 to Lys-67.
HTXNL13R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1057 as residues: Ser-48 to Arg-57, Glu-89 to Pro-95, Ser-102 to Asn-107.
H2LAK62R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1059 as residues: Pro-20 to Ser-25.
HATAR77R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1061 as residues: Gly-2 to Arg-16.
HWMEH18R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1066 as residues: Gln-61 to Ser-67.
HCNDP66R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1068 as residues: Leu-8 to Arg-15, Gln-46 to Pro-54.
HCRMK82R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1069 as residues: Ser-32 to Arg-38, Ala-72 to Lys-79, Arg-103 to Phe-111.
HSSGC52R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1075 as residues: Gly-1 to Pro-6, Arg-25 to Ile-30.
HCYBN49R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1076 as residues: Gly-16 to Gly-21, Ile-99 to Gln-109.
HWMGB90R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1077 as residues: Gly-1 to Ala-7, Asp-17 to Arg-27, Glu-32 to Leu-40.
HTEAW21R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1078 as residues: Glu-1 to Gly-6, Gln-19 to Leu-37.
H2LAQ68R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1082 as residues: Val-2 to Trp-10, Leu-25 to Lys-33.
HBAAD60R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1087 as residues: Pro-1 to Lys-32.
HCROA35R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1088 as residues: Gly-6 to Lys-12.
HCROM64R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1089 as residues: Asn-1 to Arg-7.
HKBAG82R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1091 as residues: Pro-9 to Gly-28.
HUTSB76R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1092 as residues: Lys-1 to Ser-17.
HWLJS67R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1093 as residues: Gln-3 to Lys-18, Gln-44 to Glu-49.

HTGAZ53R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1098 as residues: Ser-1 to Ala-16. Gln-36 to Thr-48.
HWLLL51R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1100 as residues: Gln-6 to Gly-18.
HWLJZ72R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1103 as residues: Ile-1 to Ser-19.
HWMFG06R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1104 as residues: Arg-1 to Lys-14. Gln-40 to Glu-45. Arg-65 to Arg-80.
HPRTO65R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1105 as residues: Thr-12 to Thr-17. Cys-35 to Ser-40.
HUFDC01R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1106 as residues: Pro-11 to Glu-26.
HWLHY44R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1107 as residues: Pro-14 to Gln-24. Cys-34 to Leu-39. Thr-72 to Val-77. Glu-94 to Thr-99. Asp-101 to Met-107. Lys-109 to Pro-116.
HWLGR92R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1108 as residues: Pro-17 to Gly-22.
HCNCQ71R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1109 as residues: Glu-22 to Leu-30.
HWLEN11R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1111 as residues: Pro-6 to Lys-21. Ala-26 to Val-34. Lys-37 to Ser-46.
HWLEH56R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1116 as residues: Thr-23 to Ala-28. Asn-88 to Trp-98. Cys-114 to Asp-131.
H2LAD26R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1117 as residues: Pro-20 to Gly-31.
H2LAK66R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1125 as residues: Pro-33 to Leu-39. Glu-54 to Val-59. Gly-69 to Ser-76.
HSDKC65R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1126 as residues: Asn-32 to Pro-39. Pro-41 to Pro-49.
H2LAK52R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1127 as residues: Pro-20 to Ala-28.
HKAEG12R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1128 as residues: Asp-47 to Lys-52.
HKADP43R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1129 as residues: Pro-7 to Pro-15. Arg-35 to Val-44.
HUSJE17R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1131 as residues: Pro-26 to Gln-32.
HHBEF06R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1133 as residues: Pro-1 to Gly-6.
HISCW28R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1134 as residues: Pro-26 to Gln-32.
HPIAK29R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1137 as residues: Thr-1 to Tyr-7.
HUFAR71R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1138 as residues: Pro-26 to Gln-32.
HOECI21R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1141 as residues: Asn-11 to Pro-20, Pro-22 to Thr-30, Glu-49 to Glu-70, Ser-84 to Thr-96, Thr-108 to Thr-113.
HMCAR63R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1143 as residues: Ala-1 to Gly-9, Lys-41 to Glu-47, Asn-65 to Gly-70, Glu-85 to Asp-93, Glu-103 to Tyr-109.
HAICY55R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1152 as residues: Glu-2 to His-9.
HWLIA38R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1153 as residues: Arg-60 to Gly-74. Ser-80 to Ile-88. Leu-92 to Ser-98.
HBXCL69R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1154 as

	residues: Ser-2 to Cys-8, Pro-10 to Leu-17.
H2LAP90R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1155 as residues: Thr-3 to Gln-9, Asn-11 to Pro-19, Gln-35 to Glu-42.
HTELE03R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1157 as residues: Asp-1 to Gln-9, Asn-11 to Arg-16, Cys-28 to Ser-44, Gln-50 to Gln-56.
HJMBN86R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1158 as residues: Ser-31 to Glu-47.
HSKJC32R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1159 as residues: Gln-151 to Glu-158, Glu-168 to Pro-173, Ser-188 to Ile-195.
HAOAG76R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1161 as residues: Gly-1 to Ala-14.
HCIAD45R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1162 as residues: Pro-1 to Lys-23, Pro-43 to Leu-49.
H2MAC82R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1163 as residues: Lys-54 to Lys-59.
H2LAJ41R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1164 as residues: Met-20 to Val-36, Ser-82 to Lys-93, Pro-101 to Arg-106.
HBJFH33R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1166 as residues: Gly-10 to Tyr-26, Asn-29 to Leu-37, Thr-52 to His-59.
HISDV92R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1167 as residues: Pro-3 to Ser-8, Asn-48 to Tyr-54.
HE9QB35R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1169 as residues: Gly-1 to Asp-6, Pro-20 to Gln-33, Tyr-46 to Arg-52, Asn-72 to Lys-85, Gln-91 to Ala-110.
HDABQ50R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1170 as residues: Ser-9 to Lys-17, Lys-41 to Arg-46.
HTPAC28R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1176 as residues: Lys-10 to Thr-15, Thr-17 to Leu-23.
HMCGN07R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1177 as residues: Asn-88 to Ser-98, Pro-123 to Val-129.
HBMVM66R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1180 as residues: Ser-2 to Gly-7, Arg-10 to Phe-24, Ala-36 to Arg-41.
HEPNA09R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1186 as residues: Ser-1 to Pro-6.
HCNDR62R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1190 as residues: Pro-14 to Ser-21.
HNJBF13R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1191 as residues: Asp-18 to Asp-28.
HLYCD69R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1192 as residues: Gly-90 to Thr-109.
HWCAA53R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1194 as residues: Ser-22 to Gly-28, Glu-37 to Ile-45, Val-67 to Arg-85, Asn-91 to Trp-99.
HFVGP11R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1198 as residues: Ala-4 to Asn-13.
HWLQH07R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1199 as residues: Lys-1 to Lys-25.
HWLKH07R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1201 as residues: Pro-49 to Asp-58.
HAPQC14R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1202 as residues: Lys-1 to Met-8.
HSODB48R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1203 as residues: Ser-24 to Gly-31, Ala-37 to Ser-44, Pro-57 to Ser-64, Pro-97 to Gly-104.
HBEAC75R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1204 as residues: Pro-1 to Arg-9.
HBGMJ24R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1205 as residues: Tyr-11 to Val-17, Thr-30 to Phe-48, Gln-150 to Thr-155.

HBJEN94R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1206 as residues: Gln-1 to Asn-6.
HLQGB87R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1213 as residues: Lys-2 to Ser-7.
HAOAC69R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1215 as residues: Ser-2 to Arg-10.
HWLEQ08R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1216 as residues: Glu-21 to His-31.
HKAAV70R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1217 as residues: Gly-6 to Thr-93, Glu-95 to Glu-104, Asp-117 to Asp-125.
HNFJE41R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1221 as residues: Arg-15 to His-21, Pro-48 to Ala-58, Asn-61 to Leu-66, Val-92 to Thr-110, Pro-114 to Thr-120.
HCRMW41R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1224 as residues: Phe-14 to Asn-19.
HOVAX78R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1225 as residues: Gly-1 to Thr-8.
HWAEH57R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1226 as residues: Ser-54 to Tyr-60, Gln-65 to Pro-72, Thr-81 to Gly-92.
HAHEK76R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1230 as residues: Cys-20 to Cys-28.
HOSCG81R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1232 as residues: Thr-8 to Asn-13.
HTFMD43R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1233 as residues: Lys-44 to Ile-52, Arg-57 to Lys-77.
H2LAR73R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1235 as residues: Pro-20 to Arg-27, Asn-47 to Lys-53, Asp-116 to Asn-123, Glu-145 to Gly-154.
HWHPK71R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1238 as residues: Asp-15 to His-24, Pro-27 to Leu-39.
HWBBJ39R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1239 as residues: His-1 to Lys-6.
HSODD94R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1241 as residues: Gly-7 to Glu-15, Gly-29 to Lys-41, Pro-43 to Ser-52, Pro-68 to His-73.
HMIAG25R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1242 as residues: Arg-19 to Ser-41, Pro-43 to Glu-54, Ser-59 to Gly-74.
HCNDW17R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1244 as residues: Lys-7 to Lys-15, Thr-54 to Asn-59.
HWLEY08R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1245 as residues: Glu-9 to Arg-14, Thr-19 to Arg-27, Asp-48 to Ile-57, Gln-63 to Leu-75, Cys-89 to Thr-104, Gly-106 to Pro-113.
HULFN68R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1246 as residues: Ser-1 to Cys-16, Lys-18 to Gly-23, Pro-31 to Tyr-37, Gly-53 to Pro-58.
HTEJJ32R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1249 as residues: Ser-17 to Cys-23, Gln-42 to Leu-51, Ser-68 to Asp-73.
H2CBS58R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1251 as residues: Ser-82 to Phe-88, Lys-110 to Gly-118.
H2LAB77R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1252 as residues: Met-13 to Asp-18, Glu-23 to Ser-43, Glu-45 to Gly-54.
HWAFP88R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1254 as residues: Arg-8 to Lys-13, Gly-35 to Lys-42, Ala-48 to Lys-54.
HWMEB67R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1256 as residues: Arg-9 to Arg-16.
HKMAA52R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1261 as residues: Gly-2 to Lys-10, Asp-36 to Asn-42.
H2LAB37R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1262 as residues: Glu-52 to Thr-59.

H2LAP46R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1263 as residues: Pro-40 to Asn-46, Tyr-71 to Arg-79.
H6BSE61R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1264 as residues: Ile-36 to Asp-41, Ala-54 to Pro-63.
HACBS75R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1269 as residues: Arg-20 to Ser-27, Arg-45 to Trp-59.
HACCA48R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1270 as residues: Lys-12 to Lys-26.
HACCS19R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1271 as residues: Gly-1 to Gly-10.
HAGGL96R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1273 as residues: Ser-74 to Phe-88.
HAGGT37R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1274 as residues: Phe-17 to Pro-22.
HAHDR66R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1275 as residues: Gly-11 to Ala-18.
HAJCL80R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1277 as residues: Asn-22 to Phe-32.
HAQMH45R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1283 as residues: Pro-2 to Tyr-13, Leu-21 to Gly-47, Val-49 to Gly-55, Pro-63 to Glu-78.
HBGCA44R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1290 as residues: Thr-20 to Trp-25, Lys-32 to Leu-40.
HBGFX27R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1291 as residues: Ser-1 to Pro-6.
HBGMU38R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1292 as residues: Gln-1 to Phe-8, Thr-34 to Trp-53, Arg-56 to Gly-63, Arg-86 to Cys-102.
HBJED55R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1295 as residues: Arg-6 to Pro-14.
HBMTJ51R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1300 as residues: Cys-8 to Asp-13.
HBWBD78R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1302 as residues: Pro-51 to Ala-58.
HCDDQ63R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1307 as residues: Gln-1 to Lys-10.
HCFCD01R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1310 as residues: Ser-1 to Thr-6.
HCFCR43R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1311 as residues: Arg-10 to Thr-20.
HCHAO92R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1313 as residues: Asn-19 to Arg-25.
HCHOH49R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1314 as residues: Asn-19 to Asp-30.
HCHPG05R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1315 as residues: Pro-6 to Ser-11.
HCIAD24R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1316 as residues: Lys-1 to Gly-7.
HCNCY51R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1319 as residues: Lys-10 to Arg-16.
HCNCY63R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1320 as residues: Gly-1 to Lys-9.
HCNDO71R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1321 as residues: Lys-33 to Ile-42, Arg-51 to Phe-64.
HCQBN22R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1324 as residues: Lys-1 to Asn-11.
HCQCL27R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1325 as residues: Gly-7 to His-27.

HCQCL48R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1326 as residues: Ala-1 to Thr-13.
HCQDJ42R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1330 as residues: Glu-8 to Asn-13, Arg-16 to Glu-24.
HCRMD77R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1331 as residues: Asn-4 to Asn-10.
HCROJ68R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1339 as residues: Ile-2 to His-8.
HCROM30R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1342 as residues: Glu-1 to Glu-7. Pro-26 to Leu-32. Gly-37 to Gln-44. Thr-84 to Thr-92.
HCROQ34R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1343 as residues: Asn-1 to Asp-11.
HCROZ66R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1345 as residues: Arg-7 to Lys-13.
HCRPC61R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1346 as residues: Ala-3 to Gly-8.
HCRPG28R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1347 as residues: Pro-26 to Ser-32.
HCRPN52R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1349 as residues: Ser-24 to Lys-30. Lys-54 to Ser-61.
HDCAA21R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1354 as residues: Phe-6 to Val-12. Ile-15 to Phe-20.
HDDAA85R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1355 as residues: Lys-18 to Lys-24.
HDPGO03R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1356 as residues: Ala-4 to Gln-17.
HDPLB08R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1357 as residues: Pro-2 to Tyr-13. Leu-21 to Ala-36.
HDQEX80R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1359 as residues: Arg-1 to Arg-6, Phe-27 to Arg-32, Pro-37 to Lys-42, Arg-47 to Trp-53, Arg-55 to Ser-61.
HDRMI91R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1360 as residues: Thr-1 to Lys-8.
HE6DJ45R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1364 as residues: Pro-1 to Asn-8.
HE9FH12R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1366 as residues: Asn-12 to Ser-20.
HEAAL59R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1370 as residues: Gln-20 to Asn-25.
HEGAR32R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1371 as residues: Lys-9 to Ser-19.
HEGAR85R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1372 as residues: Ser-16 to His-46. Arg-49 to Thr-58.
HELFE05R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1373 as residues: Tyr-8 to Leu-16.
HEMFI88R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1374 as residues: Pro-6 to Ala-13.
HEMFR18R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1375 as residues: Ala-1 to Ala-10. Pro-12 to Gly-17, Ala-22 to Cys-27, Glu-30 to Arg-35, Pro-43 to Ser-50.
HEONL43R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1376 as residues: Arg-1 to Val-10.
HFADM62R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1380 as residues: Lys-6 to Lys-14.
HFATE31R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1381 as residues: Asp-1 to Arg-9. Arg-20 to Arg-26. Glu-33 to Gly-40.

HFCEL77R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1383 as residues: Glu-33 to Ser-48. Ile-54 to Ile-63. Leu-79 to Asp-84.
HFTBI57R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1392 as residues: Pro-18 to Ser-23.
HFXGX46R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1394 as residues: Pro-11 to Gln-28.
HHBEW72R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1400 as residues: Pro-20 to Thr-27.
HHERT59R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1401 as residues: Arg-1 to Trp-9.
HJMAH76R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1405 as residues: Cys-10 to Ala-15.
HJMAN56R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1406 as residues: Ala-45 to Asp-60.
HJMAO54R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1407 as residues: Pro-28 to Gln-39. Pro-65 to Cys-80.
HKLSD93R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1409 as residues: Gly-11 to Gly-17.
HLMFH16R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1410 as residues: Gly-1 to Asp-8.
HLQCQ73R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1412 as residues: Glu-1 to Gly-6. Arg-8 to Phe-13.
HLQEF47R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1413 as residues: Leu-8 to Leu-13.
HLQFM50R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1414 as residues: Gly-29 to Asp-34.
HLQGA76R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1416 as residues: Ser-16 to Ser-33.
HLTEV09R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1418 as residues: Arg-9 to Asn-17.
HMACF85R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1421 as residues: Glu-29 to Lys-34. Leu-113 to Gln-120.
HMAIA15R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1422 as residues: Lys-15 to Gln-21. Ile-51 to Gly-57. Lys-72 to Gly-83.
HMCIS54R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1424 as residues: Lys-3 to His-24.
HNHMR05R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1427 as residues: Pro-9 to Gly-20. Thr-26 to Arg-42. Ala-48 to Ser-54.
HNJBB78R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1428 as residues: Thr-6 to Lys-13. Leu-48 to Asn-54.
HOCND06R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1433 as residues: Pro-2 to Tyr-13. Leu-21 to Ala-35.
HOCND49R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1434 as residues: Asn-2 to Gly-12. Ile-14 to Ala-30.
HODFA26R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1436 as residues: Glu-1 to His-6. Gly-19 to Asp-29. Leu-44 to Leu-49.
HODHL89R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1437 as residues: Ser-16 to His-46. Arg-49 to Thr-58.
HOEJM67R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1438 as residues: Ser-19 to Lys-25. Asp-29 to Glu-55. Ser-102 to Thr-107.
HOGBN48R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1439 as residues: Lys-14 to Arg-19. Asp-25 to Phe-32.
HOUHN53R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1442 as residues: Glu-1 to His-6. Gly-19 to Trp-31.
HPBEE63R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1444 as residues: Pro-14 to Gly-20. His-28 to Arg-35.

HPJBE91R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1446 as residues: Ser-15 to Asn-20. Ala-22 to Ile-49. Lys-52 to Val-57. Tyr-71 to Cys-83. Thr-90 to Tyr-95.
HSDZG83R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1454 as residues: Val-17 to Lys-22.
HSICQ60R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1455 as residues: Val-12 to Gly-17.
HSIFA64R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1456 as residues: His-17 to Ile-22. Leu-33 to Pro-40.
HSKYE52R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1458 as residues: Pro-2 to Ser-7.
HSODA95R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1460 as residues: Ser-14 to His-44. Arg-47 to Thr-56.
HSSGK43R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1462 as residues: Ser-24 to Leu-35. Pro-38 to Ser-45.
HTXFA64R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1470 as residues: Thr-1 to Glu-8.
HUSJF91R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1471 as residues: Gly-1 to Gly-6.
HUSJN48R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1472 as residues: Ser-16 to Tyr-24.
HUSZN23R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1474 as residues: Ser-16 to Lys-24.
HUTSD20R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1475 as residues: Arg-10 to Asn-20.
HWAFI63R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1477 as residues: Pro-15 to Gly-24. Pro-26 to Arg-45.
HWAGZ89R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1478 as residues: Ser-47 to Lys-52.
HWHHM83R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1480 as residues: Leu-1 to Gly-6.
HWLBS90R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1484 as residues: Lys-37 to Asn-44.
HWLEH13R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1486 as residues: Gln-22 to Glu-29.
HWLEJ67R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1487 as residues: Asn-5 to Trp-13.
HWLEM49R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1488 as residues: Glu-1 to His-6. Gly-19 to Trp-31.
HWLGM21R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1492 as residues: Glu-1 to His-6. Gly-19 to Trp-31.
HWLGS46R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1494 as residues: Glu-17 to Asn-23. Glu-38 to Gly-49.
HWLGU40R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1495 as residues: His-10 to Pro-15.
HWLGX65R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1496 as residues: Glu-1 to Asn-7.
HWLHD09R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1497 as residues: Pro-6 to Ala-37. Arg-40 to Ser-49.
HWLHW89R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1500 as residues: Asn-1 to Lys-16. Glu-32 to Ser-41. Leu-57 to Gly-71.
HWLJL19R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1506 as residues: Arg-46 to Phe-58.
HWLKG82R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1508 as residues: Pro-5 to Gly-25. Ser-29 to Leu-36. Arg-49 to Phe-55.
HWLKM86R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1512 as

	residues: Arg-10 to Lys-23.
HWLQS83R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1515 as residues: Ala-1 to Arg-6.
HWLRP86R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1518 as residues: Tyr-3 to Gly-10..
HWLRQ49R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1519 as residues: Pro-19 to Ser-26. Gln-44 to Lys-52.
HWLUF60R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1520 as residues: Gln-7 to Lys-31.
HWLUR41R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1522 as residues: Ser-24 to Trp-30.
HWLVD60R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1523 as residues: Cys-15 to Lys-51.
HWMAN61R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1525 as residues: Ser-21 to Asp-26.
HWMEH26R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1528 as residues: Ser-16 to His-46. Arg-49 to Thr-58.
HWMEL50R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1529 as residues: Pro-24 to Thr-40. Phe-63 to Arg-69.
HWMFB31R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1530 as residues: Asn-2 to Lys-10. Cys-16 to Pro-28. Ser-36 to Glu-41.
HWMFO93R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1532 as residues: Ser-8 to Gln-14.
HMAFE48R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1537 as residues: Glu-9 to Gly-17.
HRODJ88R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1538 as residues: Gly-6 to Tyr-14.
HWLAR31R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1539 as residues: Glu-9 to Gly-17.
H2LAU24R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1541 as residues: Glu-11 to Gly-19.
HATDR94R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1542 as residues: Glu-14 to Lys-19. Asn-21 to Gly-27.
HWLLI85R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1543 as residues: Val-19 to Asn-32.
HSYCH41R	Preferred epitopes include those comprising a sequence shown in SEQ ID NO. 1545 as residues: Thr-71 to Ile-79.

The present invention encompasses polypeptides comprising, or alternatively consisting of, an epitope of the polypeptide sequence shown in SEQ ID NO:Y, or an epitope of the polypeptide sequence encoded by the cDNA in the related cDNA clone contained in a deposited library or encoded by a polynucleotide that hybridizes to the complement of an epitope encoding sequence of SEQ ID NO:X, or an epitope encoding sequence contained in the deposited cDNA clone under stringent hybridization conditions, or alternatively, under lower stringency hybridization conditions, as defined supra. The present invention further encompasses polynucleotide sequences encoding an epitope of a polypeptide sequence of the invention (such as, for example, the sequence disclosed in SEQ ID NO:X), polynucleotide sequences of the complementary strand of a polynucleotide sequence encoding an epitope of the invention, and polynucleotide sequences which hybridize to this complementary strand under stringent hybridization conditions or alternatively, under lower stringency hybridization conditions, as defined supra.

The term "epitopes," as used herein, refers to portions of a polypeptide having antigenic or immunogenic activity in an animal, preferably a mammal, and most preferably in a human. In a preferred embodiment, the present invention encompasses a polypeptide comprising an epitope, as well as the polynucleotide encoding this polypeptide. An "immunogenic epitope," as used herein, is defined as a portion of a protein that elicits an antibody response in an animal, as determined by any method known in the art, for example, by the methods for generating antibodies described infra. (See, for example, Geysen et al., Proc. Natl. Acad. Sci. USA 81:3998- 4002 (1983)). The term "antigenic epitope," as used herein, is defined as a portion of a protein to which an antibody can immunospecifically bind its antigen as determined by any method well known in the art, for example, by the immunoassays described herein. Immunospecific binding excludes non-specific binding but does not necessarily exclude cross- reactivity with other antigens. Antigenic epitopes need not necessarily be immunogenic.

Fragments which function as epitopes may be produced by any conventional means. (See, e.g., Houghten, R. A., Proc. Natl. Acad. Sci. USA 82:5131-5135 (1985) further described in U.S. Patent No. 4,631,211.)

In the present invention, antigenic epitopes preferably contain a sequence of at least 4, at least 5, at least 6, at least 7, more preferably at least 8, at least 9, at least 10, at least 11, at least 12, at least 13, at least 14, at least 15, at least 20, at least 25, at least 30, at least 40, at

least 50, and, most preferably, between about 15 to about 30 amino acids. Preferred polypeptides comprising immunogenic or antigenic epitopes are at least 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or 100 amino acid residues in length. Additional non-exclusive preferred antigenic epitopes include the antigenic epitopes disclosed herein, as well as portions thereof. Antigenic epitopes are useful, for example, to raise antibodies, including monoclonal antibodies, that specifically bind the epitope. Preferred antigenic epitopes include the antigenic epitopes disclosed herein, as well as any combination of two, three, four, five or more of these antigenic epitopes. Antigenic epitopes can be used as the target molecules in immunoassays. (See, for instance, Wilson et al., Cell 37:767-778 (1984); Sutcliffe et al., Science 219:660-666 (1983)).

Similarly, immunogenic epitopes can be used, for example, to induce antibodies according to methods well known in the art. (See, for instance, Sutcliffe et al., supra; Wilson et al., supra; Chow et al., Proc. Natl. Acad. Sci. USA 82:910-914; and Bittle et al., J. Gen. Virol. 66:2347-2354 (1985). Preferred immunogenic epitopes include the immunogenic epitopes disclosed herein, as well as any combination of two, three, four, five or more of these immunogenic epitopes. The polypeptides comprising one or more immunogenic epitopes may be presented for eliciting an antibody response together with a carrier protein, such as an albumin, to an animal system (such as rabbit or mouse), or, if the polypeptide is of sufficient length (at least about 25 amino acids), the polypeptide may be presented without a carrier. However, immunogenic epitopes comprising as few as 8 to 10 amino acids have been shown to be sufficient to raise antibodies capable of binding to, at the very least, linear epitopes in a denatured polypeptide (e.g., in Western blotting).

Epitope-bearing polypeptides of the present invention may be used to induce antibodies according to methods well known in the art including, but not limited to, in vivo immunization, in vitro immunization, and phage display methods. See, e.g., Sutcliffe et al., supra; Wilson et al., supra, and Bittle et al., J. Gen. Virol., 66:2347-2354 (1985). If in vivo immunization is used, animals may be immunized with free peptide; however, anti-peptide antibody titer may be boosted by coupling the peptide to a macromolecular carrier, such as keyhole limpet hemacyanin (KLH) or tetanus toxoid. For instance, peptides containing cysteine residues may be coupled to a carrier using a linker such as maleimidobenzoyl- N-hydroxysuccinimide ester (MBS), while other peptides may be coupled to carriers using a more general linking agent such as glutaraldehyde. Animals such as rabbits, rats and mice

are immunized with either free or carrier- coupled peptides, for instance, by intraperitoneal and/or intradermal injection of emulsions containing about 100 μg of peptide or carrier protein and Freund's adjuvant or any other adjuvant known for stimulating an immune response. Several booster injections may be needed, for instance, at intervals of about two weeks, to provide a useful titer of anti-peptide antibody which can be detected, for example, by ELISA assay using free peptide adsorbed to a solid surface. The titer of anti-peptide antibodies in serum from an immunized animal may be increased by selection of anti-peptide antibodies, for instance, by adsorption to the peptide on a solid support and elution of the selected antibodies according to methods well known in the art.

As one of skill in the art will appreciate, and as discussed above, the polypeptides of the present invention , and immunogenic and/or antigenic epitope fragments thereof can be fused to other polypeptide sequences. For example, the polypeptides of the present invention may be fused with the constant domain of immunoglobulins (IgA, IgE, IgG, IgM), or portions thereof (CH1, CH2, CH3, or any combination thereof and portions thereof) resulting in chimeric polypeptides. Such fusion proteins may facilitate purification and may increase half-life in vivo. This has been shown for chimeric proteins consisting of the first two domains of the human CD4-polypeptide and various domains of the constant regions of the heavy or light chains of mammalian immunoglobulins. See, e.g., EP 394,827; Traunecker et al., Nature, 331:84-86 (1988). Enhanced delivery of an antigen across the epithelial barrier to the immune system has been demonstrated for antigens (e.g., insulin) conjugated to an FcRn binding partner such as IgG or Fc fragments (see, e.g., PCT Publications WO 96/22024 and WO 99/04813). IgG Fusion proteins that have a disulfide-linked dimeric structure due to the IgG portion desulfide bonds have also been found to be more efficient in binding and neutralizing other molecules than monomeric polypeptides or fragments thereof alone. See, e.g., Fountoulakis et al., J. Biochem., 270:3958-3964 (1995).

Similarly, EP-A-O 464 533 (Canadian counterpart 2045869) discloses fusion proteins comprising various portions of constant region of immunoglobulin molecules together with another human protein or part thereof. In many cases, the Fc part in a fusion protein is beneficial in therapy and diagnosis, and thus can result in, for example, improved pharmacokinetic properties. (EP-A 0232 262.) Alternatively, deleting the Fc part after the fusion protein has been expressed, detected, and purified, may be desired. For example, the Fc portion may hinder therapy and diagnosis if the fusion protein is used as an antigen for

immunizations. In drug discovery, for example, human proteins, such as hIL-5, have been fused with Fc portions for the purpose of high-throughput screening assays to identify antagonists of hIL-5. (See, D. Bennett et al., J. Molecular Recognition 8:52-58 (1995); K. Johanson et al., J. Biol. Chem. 270:9459-9471 (1995).)

Moreover, the polypeptides of the present invention can be fused to marker sequences, such as a peptide which facilitates purification of the fused polypeptide. In preferred embodiments, the marker amino acid sequence is a hexa-histidine peptide, such as the tag provided in a pQE vector (QIAGEN, Inc., 9259 Eton Avenue, Chatsworth, CA, 91311), among others, many of which are commercially available. As described in Gentz et al., Proc. Natl. Acad. Sci. USA 86:821-824 (1989), for instance, hexa-histidine provides for convenient purification of the fusion protein. Another peptide tag useful for purification, the "HA" tag, corresponds to an epitope derived from the influenza hemagglutinin protein. (Wilson et al., Cell 37:767 (1984).)

Thus, any of these above fusions can be engineered using the polynucleotides or the polypeptides of the present invention.

Nucleic acids encoding the above epitopes can also be recombined with a gene of interest as an epitope tag (e.g., the hemagglutinin ("HA") tag or flag tag) to aid in detection and purification of the expressed polypeptide. For example, a system described by Janknecht et al. allows for the ready purification of non-denatured fusion proteins expressed in human cell lines (Janknecht et al., Proc. Natl. Acad. Sci. USA 88:8972- 897 (1991)). In this system, the gene of interest is subcloned into a vaccinia recombination plasmid such that the open reading frame of the gene is translationally fused to an amino-terminal tag consisting of six histidine residues. The tag serves as a matrix binding domain for the fusion protein. Extracts from cells infected with the recombinant vaccinia virus are loaded onto Ni2+ nitriloacetic acid-agarose column and histidine-tagged proteins can be selectively eluted with imidazole-containing buffers.

Additional fusion proteins of the invention may be generated through the techniques of gene-shuffling, motif-shuffling, exon-shuffling, and/or codon-shuffling (collectively referred to as "DNA shuffling"). DNA shuffling may be employed to modulate the activities of polypeptides of the invention, such methods can be used to generate polypeptides with altered activity, as well as agonists and antagonists of the polypeptides. See, generally, U.S. Patent Nos. 5,605,793; 5,811,238; 5,830,721; 5,834,252; and 5,837,458, and Patten et al.,

Curr. Opinion Biotechnol. 8:724-33 (1997); Harayama, Trends Biotechnol. 16(2):76-82 (1998); Hansson, et al., J. Mol. Biol. 287:265-76 (1999); and Lorenzo and Blasco, Biotechniques 24(2):308- 13 (1998) (each of these patents and publications are hereby incorporated by reference in its entirety). In one embodiment, alteration of polynucleotides corresponding to SEQ ID NO:X and the polypeptides encoded by these polynucleotides may be achieved by DNA shuffling. DNA shuffling involves the assembly of two or more DNA segments by homologous or site-specific recombination to generate variation in the polynucleotide sequence. In another embodiment, polynucleotides of the invention, or the encoded polypeptides, may be altered by being subjected to random mutagenesis by error-prone PCR, random nucleotide insertion or other methods prior to recombination. In another embodiment, one or more components, motifs, sections, parts, domains, fragments, etc., of a polynucleotide encoding a polypeptide of the invention may be recombined with one or more components, motifs, sections, parts, domains, fragments, etc. of one or more heterologous molecules.

As discussed herein, any polypeptide of the present invention can be used to generate fusion proteins. For example, the polypeptide of the present invention, when fused to a second protein, can be used as an antigenic tag. Antibodies raised against the polypeptide of the present invention can be used to indirectly detect the second protein by binding to the polypeptide. Moreover, because secreted proteins target cellular locations based on trafficking signals, polypeptides of the present invention which are shown to be secreted can be used as targeting molecules once fused to other proteins.

Examples of domains that can be fused to polypeptides of the present invention include not only heterologous signal sequences, but also other heterologous functional regions. The fusion does not necessarily need to be direct, but may occur through linker sequences.

In certain preferred embodiments, proteins of the invention comprise fusion proteins wherein the polypeptides are N and/or C- terminal deletion mutants. In preferred embodiments, the application is directed to nucleic acid molecules at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to the nucleic acid sequences encoding polypeptides having the amino acid sequence of the specific N- and C-terminal deletions mutants. Polynucleotides encoding these polypeptides are also encompassed by the invention.

Moreover, fusion proteins may also be engineered to improve characteristics of the polypeptide of the present invention. For instance, a region of additional amino acids, particularly charged amino acids, may be added to the N-terminus of the polypeptide to improve stability and persistence during purification from the host cell or subsequent handling and storage. Also, peptide moieties may be added to the polypeptide to facilitate purification. Such regions may be removed prior to final preparation of the polypeptide. The addition of peptide moieties to facilitate handling of polypeptides are familiar and routine techniques in the art.

Vectors, Host Cells, and Protein Production

The present invention also relates to vectors containing the polynucleotide of the present invention, host cells, and the production of polypeptides by recombinant techniques. The vector may be, for example, a phage, plasmid, viral, or retroviral vector. Retroviral vectors may be replication competent or replication defective. In the latter case, viral propagation generally will occur only in complementing host cells.

The polynucleotides of the invention may be joined to a vector containing a selectable marker for propagation in a host. Generally, a plasmid vector is introduced in a precipitate, such as a calcium phosphate precipitate, or in a complex with a charged lipid. If the vector is a virus, it may be packaged in vitro using an appropriate packaging cell line and then transduced into host cells.

The polynucleotide insert should be operatively linked to an appropriate promoter, such as the phage lambda PL promoter, the E. coli lac, trp, phoA and tac promoters, the SV40 early and late promoters and promoters of retroviral LTRs, to name a few. Other suitable promoters will be known to the skilled artisan. The expression constructs will further contain sites for transcription initiation, termination, and, in the transcribed region, a ribosome binding site for translation. The coding portion of the transcripts expressed by the constructs will preferably include a translation initiating codon at the beginning and a termination codon (UAA, UGA or UAG) appropriately positioned at the end of the polypeptide to be translated.

As indicated, the expression vectors will preferably include at least one selectable marker. Such markers include dihydrofolate reductase, G418 or neomycin resistance for eukaryotic cell culture and tetracycline, kanamycin or ampicillin resistance genes for culturing in E. coli and other bacteria. Representative examples of appropriate hosts include,

but are not limited to, bacterial cells, such as E. coli, Streptomyces and Salmonella typhimurium cells; fungal cells, such as yeast cells (e.g., Saccharomyces cerevisiae or Pichia pastoris (ATCC Accession No. 201178)); insect cells such as Drosophila S2 and Spodoptera Sf9 cells; animal cells such as CHO, COS, 293, and Bowes melanoma cells; and plant cells. Appropriate culture mediums and conditions for the above-described host cells are known in the art.

Among vectors preferred for use in bacteria include pQE70, pQE60 and pQE-9, available from QIAGEN, Inc.; pBluescript vectors, Phagescript vectors, pNH8A, pNH16a, pNH18A, pNH46A, available from Stratagene Cloning Systems, Inc.; and ptrc99a, pKK223-3, pKK233-3, pDR540, pRIT5 available from Pharmacia Biotech, Inc. Among preferred eukaryotic vectors are pWLNEO, pSV2CAT, pOG44, pXT1 and pSG available from Stratagene; and pSVK3, pBPV, pMSG and pSVL available from Pharmacia. Preferred expression vectors for use in yeast systems include, but are not limited to pYES2, pYD1, pTEF1/Zeo, pYES2/GS, pPICZ, pGAPZ, pGAPZalph, pPIC9, pPIC3.5, pHIL-D2, pHIL-S1, pPIC3.5K, pPIC9K, and PAO815 (all available from Invitrogen, Carlbad, CA). Other suitable vectors will be readily apparent to the skilled artisan.

Introduction of the construct into the host cell can be effected by calcium phosphate transfection, DEAE-dextran mediated transfection, cationic lipid-mediated transfection, electroporation, transduction, infection, or other methods. Such methods are described in many standard laboratory manuals, such as Davis et al., Basic Methods In Molecular Biology (1986). It is specifically contemplated that the polypeptides of the present invention may in fact be expressed by a host cell lacking a recombinant vector.

A polypeptide of this invention can be recovered and purified from recombinant cell cultures by well-known methods including ammonium sulfate or ethanol precipitation, acid extraction, anion or cation exchange chromatography, phosphocellulose chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite chromatography and lectin chromatography. Most preferably, high performance liquid chromatography ("HPLC") is employed for purification.

Polypeptides of the present invention can also be recovered from: products purified from natural sources, including bodily fluids, tissues and cells, whether directly isolated or cultured; products of chemical synthetic procedures; and products produced by recombinant techniques from a prokaryotic or eukaryotic host, including, for example, bacterial, yeast,

higher plant, insect, and mammalian cells. Depending upon the host employed in a recombinant production procedure, the polypeptides of the present invention may be glycosylated or may be non-glycosylated. In addition, polypeptides of the invention may also include an initial modified methionine residue, in some cases as a result of host-mediated processes. Thus, it is well known in the art that the N-terminal methionine encoded by the translation initiation codon generally is removed with high efficiency from any protein after translation in all eukaryotic cells. While the N-terminal methionine on most proteins also is efficiently removed in most prokaryotes, for some proteins, this prokaryotic removal process is inefficient, depending on the nature of the amino acid to which the N-terminal methionine is covalently linked.

In one embodiment, the yeast *Pichia pastoris* is used to express polypeptides of the invention in a eukaryotic system. *Pichia pastoris* is a methylotrophic yeast which can metabolize methanol as its sole carbon source. A main step in the methanol metabolization pathway is the oxidation of methanol to formaldehyde using O_2. This reaction is catalyzed by the enzyme alcohol oxidase. In order to metabolize methanol as its sole carbon source, *Pichia pastoris* must generate high levels of alcohol oxidase due, in part, to the relatively low affinity of alcohol oxidase for O_2. Consequently, in a growth medium depending on methanol as a main carbon source, the promoter region of one of the two alcohol oxidase genes (*AOX1*) is highly active. In the presence of methanol, alcohol oxidase produced from the *AOX1* gene comprises up to approximately 30% of the total soluble protein in *Pichia pastoris*. *See*, Ellis, S.B., *et al., Mol. Cell. Biol.* 5:1111-21 (1985); Koutz, P.J, *et al., Yeast* 5:167-77 (1989); Tschopp, J.F., *et al., Nucl. Acids Res.* 15:3859-76 (1987). Thus, a heterologous coding sequence, such as, for example, a polynucleotide of the present invention, under the transcriptional regulation of all or part of the *AOX1* regulatory sequence is expressed at exceptionally high levels in *Pichia* yeast grown in the presence of methanol.

In one example, the plasmid vector pPIC9K is used to express DNA encoding a polypeptide of the invention, as set forth herein, in a *Pichea* yeast system essentially as described in "*Pichia* Protocols: Methods in Molecular Biology," D.R. Higgins and J. Cregg, eds. The Humana Press, Totowa, NJ, 1998. This expression vector allows expression and secretion of a polypeptide of the invention by virtue of the strong *AOX1* promoter linked to

the *Pichia pastoris* alkaline phosphatase (PHO) secretory signal peptide (i.e., leader) located upstream of a multiple cloning site.

Many other yeast vectors could be used in place of pPIC9K, such as, pYES2, pYD1, pTEF1/Zeo, pYES2/GS, pPICZ, pGAPZ, pGAPZalpha, pPIC9, pPIC3.5, pHIL-D2, pHIL-S1, pPIC3.5K, and PAO815, as one skilled in the art would readily appreciate, as long as the proposed expression construct provides appropriately located signals for transcription, translation, secretion (if desired), and the like, including an in-frame AUG as required.

In another embodiment, high-level expression of a heterologous coding sequence, such as, for example, a polynucleotide of the present invention, may be achieved by cloning the heterologous polynucleotide of the invention into an expression vector such as, for example, pGAPZ or pGAPZalpha, and growing the yeast culture in the absence of methanol.

In addition to encompassing host cells containing the vector constructs discussed herein, the invention also encompasses primary, secondary, and immortalized host cells of vertebrate origin, particularly mammalian origin, that have been engineered to delete or replace endogenous genetic material (e.g., coding sequence), and/or to include genetic material (e.g., heterologous polynucleotide sequences) that is operably associated with polynucleotides of the invention, and which activates, alters, and/or amplifies endogenous polynucleotides. For example, techniques known in the art may be used to operably associate heterologous control regions (e.g., promoter and/or enhancer) and endogenous polynucleotide sequences via homologous recombination (see, e.g., U.S. Patent No. 5,641,670, issued June 24, 1997; International Publication No. WO 96/29411, published September 26, 1996; International Publication No. WO 94/12650, published August 4, 1994; Koller et al., Proc. Natl. Acad. Sci. USA 86:8932-8935 (1989); and Zijlstra et al., Nature 342:435-438 (1989), the disclosures of each of which are incorporated by reference in their entireties).

In addition, polypeptides of the invention can be chemically synthesized using techniques known in the art (e.g., see Creighton, 1983, Proteins: Structures and Molecular Principles, W.H. Freeman & Co., N.Y., and Hunkapiller et al., *Nature*, 310:105-111 (1984)). For example, a polypeptide corresponding to a fragment of a polypeptide can be synthesized by use of a peptide synthesizer. Furthermore, if desired, nonclassical amino acids or chemical amino acid analogs can be introduced as a substitution or addition into the

polypeptide sequence. Non-classical amino acids include, but are not limited to, to the D-isomers of the common amino acids, 2,4-diaminobutyric acid, a-amino isobutyric acid, 4-aminobutyric acid, Abu, 2-amino butyric acid, g-Abu, e-Ahx, 6-amino hexanoic acid, Aib, 2-amino isobutyric acid, 3-amino propionic acid, ornithine, norleucine, norvaline, hydroxyproline, sarcosine, citrulline, homocitrulline, cysteic acid, t-butylglycine, t-butylalanine, phenylglycine, cyclohexylalanine, b-alanine, fluoro-amino acids, designer amino acids such as b-methyl amino acids, Ca-methyl amino acids, Na-methyl amino acids, and amino acid analogs in general. Furthermore, the amino acid can be D (dextrorotary) or L (levorotary).

Non-naturally occurring variants may be produced using art-known mutagenesis techniques, which include, but are not limited to oligonucleotide mediated mutagenesis, alanine scanning, PCR mutagenesis, site directed mutagenesis (*see, e.g.*, Carter *et al.*, *Nucl. Acids Res.* *13*:4331 (1986); and Zoller *et al.*, *Nucl. Acids Res.* *10*:6487 (1982)), cassette mutagenesis (*see, e.g.*, Wells *et al.*, *Gene 34*:315 (1985)), restriction selection mutagenesis (*see, e.g.*, Wells *et al.*, *Philos. Trans. R. Soc. London SerA 317*:415 (1986)).

The invention additionally, encompasses polypeptides of the present invention which are differentially modified during or after translation, e.g., by glycosylation, acetylation, phosphorylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to an antibody molecule or other cellular ligand, etc. Any of numerous chemical modifications may be carried out by known techniques, including but not limited, to specific chemical cleavage by cyanogen bromide, trypsin, chymotrypsin, papain, V8 protease, $NaBH_4$; acetylation, formylation, oxidation, reduction; metabolic synthesis in the presence of tunicamycin; etc.

Additional post-translational modifications encompassed by the invention include, for example, e.g., N-linked or O-linked carbohydrate chains, processing of N-terminal or C-terminal ends), attachment of chemical moieties to the amino acid backbone, chemical modifications of N-linked or O-linked carbohydrate chains, and addition or deletion of an N-terminal methionine residue as a result of procaryotic host cell expression. The polypeptides may also be modified with a detectable label, such as an enzymatic, fluorescent, isotopic or affinity label to allow for detection and isolation of the protein.

Also provided by the invention are chemically modified derivatives of the polypeptides of the invention which may provide additional advantages such as increased

solubility, stability and circulating time of the polypeptide, or decreased immunogenicity (see U.S. Patent No. 4,179,337). The chemical moieties for derivitization may be selected from water soluble polymers such as polyethylene glycol, ethylene glycol/propylene glycol copolymers, carboxymethylcellulose, dextran, polyvinyl alcohol and the like. The polypeptides may be modified at random positions within the molecule, or at predetermined positions within the molecule and may include one, two, three or more attached chemical moieties.

The polymer may be of any molecular weight, and may be branched or unbranched. For polyethylene glycol, the preferred molecular weight is between about 1 kDa and about 100 kDa (the term "about" indicating that in preparations of polyethylene glycol, some molecules will weigh more, some less, than the stated molecular weight) for ease in handling and manufacturing. Other sizes may be used, depending on the desired therapeutic profile (e.g., the duration of sustained release desired, the effects, if any on biological activity, the ease in handling, the degree or lack of antigenicity and other known effects of the polyethylene glycol to a therapeutic protein or analog). For example, the polyethylene glycol may have an average molecular weight of about 200; 500; 1000; 1500; 2000; 2500; 3000; 3500; 4000; 4500; 5000; 5500; 6000; 6500; 7000; 7500; 8000; 8500; 9000; 9500; 10,000; 10,500; 11,000; 11,500; 12,000; 12,500; 13,000; 13,500; 14,000; 14,500; 15,000; 15,500; 16,000; 16,500; 17,000; 17,500; 18,000; 18,500; 19,000; 19,500; 20,000; 25,000; 30,000; 35,000; 40,000; 50,000; 55,000; 60,000; 65,000; 70,000; 75,000; 80,000; 85,000; 90,000; 95,000; or 100,000 kDa.

As noted above, the polyethylene glycol may have a branched structure. Branched polyethylene glycols are described, for example, in U.S. Patent No. 5,643,575; Morpurgo *et al., Appl. Biochem. Biotechnol. 56*:59-72 (1996); Vorobjev *et al., Nucleosides Nucleotides 18*:2745-2750 (1999); and Caliceti *et al., Bioconjug. Chem. 10*:638-646 (1999), the disclosures of each of which are incorporated herein by reference.

The polyethylene glycol molecules (or other chemical moieties) should be attached to the protein with consideration of effects on functional or antigenic domains of the protein. There are a number of attachment methods available to those skilled in the art, e.g., EP 0 401 384, herein incorporated by reference (coupling PEG to G-CSF), see also Malik et al., Exp. Hematol. 20:1028-1035 (1992) (reporting pegylation of GM-CSF using tresyl chloride). For example, polyethylene glycol may be covalently bound through amino acid residues via a

reactive group, such as, a free amino or carboxyl group. Reactive groups are those to which an activated polyethylene glycol molecule may be bound. The amino acid residues having a free amino group may include lysine residues and the N-terminal amino acid residues: those having a free carboxyl group may include aspartic acid residues glutamic acid residues and the C-terminal amino acid residue. Sulfhydryl groups may also be used as a reactive group for attaching the polyethylene glycol molecules. Preferred for therapeutic purposes is attachment at an amino group, such as attachment at the N-terminus or lysine group.

As suggested above, polyethylene glycol may be attached to proteins via linkage to any of a number of amino acid residues. For example, polyethylene glycol can be linked to a proteins via covalent bonds to lysine, histidine, aspartic acid, glutamic acid, or cysteine residues. One or more reaction chemistries may be employed to attach polyethylene glycol to specific amino acid residues (e.g., lysine, histidine, aspartic acid, glutamic acid, or cysteine) of the protein or to more than one type of amino acid residue (e.g., lysine, histidine, aspartic acid, glutamic acid, cysteine and combinations thereof) of the protein.

One may specifically desire proteins chemically modified at the N-terminus. Using polyethylene glycol as an illustration of the present composition, one may select from a variety of polyethylene glycol molecules (by molecular weight, branching, etc.), the proportion of polyethylene glycol molecules to protein (polypeptide) molecules in the reaction mix, the type of pegylation reaction to be performed, and the method of obtaining the selected N-terminally pegylated protein. The method of obtaining the N-terminally pegylated preparation (i.e., separating this moiety from other monopegylated moieties if necessary) may be by purification of the N-terminally pegylated material from a population of pegylated protein molecules. Selective proteins chemically modified at the N-terminus modification may be accomplished by reductive alkylation which exploits differential reactivity of different types of primary amino groups (lysine versus the N-terminal) available for derivatization in a particular protein. Under the appropriate reaction conditions, substantially selective derivatization of the protein at the N-terminus with a carbonyl group containing polymer is achieved.

As indicated above, pegylation of the proteins of the invention may be accomplished by any number of means. For example, polyethylene glycol may be attached to the protein either directly or by an intervening linker. Linkerless systems for attaching polyethylene glycol to proteins are described in Delgado *et al., Crit. Rev. Thera. Drug Carrier Sys.* 9:249-

304 (1992); Francis *et al., Intern. J. of Hematol. 68*:1-18 (1998); U.S. Patent No. 4,002,531; U.S. Patent No. 5,349,052; WO 95/06058; and WO 98/32466, the disclosures of each of which are incorporated herein by reference.

One system for attaching polyethylene glycol directly to amino acid residues of proteins without an intervening linker employs tresylated MPEG, which is produced by the modification of monmethoxy polyethylene glycol (MPEG) using tresylchloride ($ClSO_2CH_2CF_3$). Upon reaction of protein with tresylated MPEG, polyethylene glycol is directly attached to amine groups of the protein. Thus, the invention includes protein-polyethylene glycol conjugates produced by reacting proteins of the invention with a polyethylene glycol molecule having a 2,2,2-trifluoreothane sulphonyl group.

Polyethylene glycol can also be attached to proteins using a number of different intervening linkers. For example, U.S. Patent No. 5,612,460, the entire disclosure of which is incorporated herein by reference, discloses urethane linkers for connecting polyethylene glycol to proteins. Protein-polyethylene glycol conjugates wherein the polyethylene glycol is attached to the protein by a linker can also be produced by reaction of proteins with compounds such as MPEG-succinimidylsuccinate, MPEG activated with 1,1'-carbonyldiimidazole, MPEG-2,4,5-trichloropenylcarbonate, MPEG-p-nitrophenolcarbonate, and various MPEG-succinate derivatives. A number additional polyethylene glycol derivatives and reaction chemistries for attaching polyethylene glycol to proteins are described in WO 98/32466, the entire disclosure of which is incorporated herein by reference. Pegylated protein products produced using the reaction chemistries set out herein are included within the scope of the invention.

The number of polyethylene glycol moieties attached to each protein of the invention (*i.e.*, the degree of substitution) may also vary. For example, the pegylated proteins of the invention may be linked, on average, to 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 17, 20, or more polyethylene glycol molecules. Similarly, the average degree of substitution within ranges such as 1-3, 2-4, 3-5, 4-6, 5-7, 6-8, 7-9, 8-10, 9-11, 10-12, 11-13, 12-14, 13-15, 14-16, 15-17, 16-18, 17-19, or 18-20 polyethylene glycol moieties per protein molecule. Methods for determining the degree of substitution are discussed, for example, in Delgado *et al., Crit. Rev. Thera. Drug Carrier Sys. 9*:249-304 (1992).

The colon cancer antigen polypeptides of the invention may be in monomers or multimers (i.e., dimers, trimers, tetramers and higher multimers). Accordingly, the present

invention relates to monomers and multimers of the polypeptides of the invention, their preparation. and compositions (preferably, Therapeutics) containing them. In specific embodiments. the polypeptides of the invention are monomers. dimers, trimers or tetramers. In additional embodiments. the multimers of the invention are at least dimers, at least trimers, or at least tetramers.

Multimers encompassed by the invention may be homomers or heteromers. As used herein, the term homomer. refers to a multimer containing only polypeptides corresponding to the amino acid sequence of SEQ ID NO:Y or an amino acid sequence encoded by SEQ ID NO:X, and/or an amino acid sequence encoded by the cDNA in a related cDNA clone contained in a deposited library (including fragments, variants, splice variants, and fusion proteins. corresponding to any one of these as described herein). These homomers may contain polypeptides having identical or different amino acid sequences. In a specific embodiment, a homomer of the invention is a multimer containing only polypeptides having an identical amino acid sequence. In another specific embodiment, a homomer of the invention is a multimer containing polypeptides having different amino acid sequences. In specific embodiments, the multimer of the invention is a homodimer (e.g., containing polypeptides having identical or different amino acid sequences) or a homotrimer (e.g., containing polypeptides having identical and/or different amino acid sequences). In additional embodiments, the homomeric multimer of the invention is at least a homodimer, at least a homotrimer, or at least a homotetramer.

As used herein, the term heteromer refers to a multimer containing one or more heterologous polypeptides (i.e., polypeptides of different proteins) in addition to the polypeptides of the invention. In a specific embodiment, the multimer of the invention is a heterodimer, a heterotrimer, or a heterotetramer. In additional embodiments, the heteromeric multimer of the invention is at least a heterodimer, at least a heterotrimer, or at least a heterotetramer.

Multimers of the invention may be the result of hydrophobic, hydrophilic, ionic and/or covalent associations and/or may be indirectly linked, by for example, liposome formation. Thus, in one embodiment, multimers of the invention, such as, for example, homodimers or homotrimers. are formed when polypeptides of the invention contact one another in solution. In another embodiment, heteromultimers of the invention, such as, for example, heterotrimers or heterotetramers, are formed when polypeptides of the invention

contact antibodies to the polypeptides of the invention (including antibodies to the heterologous polypeptide sequence in a fusion protein of the invention) in solution. In other embodiments, multimers of the invention are formed by covalent associations with and/or between the polypeptides of the invention. Such covalent associations may involve one or more amino acid residues contained in the polypeptide sequence (e.g., that recited in SEQ ID NO:Y, or contained in a polypeptide encoded by SEQ ID NO:X, and/or by the cDNA in the related cDNA clone contained in a deposited library). In one instance, the covalent associations are cross-linking between cysteine residues located within the polypeptide sequences which interact in the native (i.e., naturally occurring) polypeptide. In another instance, the covalent associations are the consequence of chemical or recombinant manipulation. Alternatively, such covalent associations may involve one or more amino acid residues contained in the heterologous polypeptide sequence in a fusion protein. In one example, covalent associations are between the heterologous sequence contained in a fusion protein of the invention (see, e.g., US Patent Number 5,478,925). In a specific example, the covalent associations are between the heterologous sequence contained in a Fc fusion protein of the invention (as described herein). In another specific example, covalent associations of fusion proteins of the invention are between heterologous polypeptide sequence from another protein that is capable of forming covalently associated multimers, such as for example, oseteoprotegerin (see, e.g., International Publication NO: WO 98/49305, the contents of which are herein incorporated by reference in its entirety). In another embodiment, two or more polypeptides of the invention are joined through peptide linkers. Examples include those peptide linkers described in U.S. Pat. No. 5,073,627 (hereby incorporated by reference). Proteins comprising multiple polypeptides of the invention separated by peptide linkers may be produced using conventional recombinant DNA technology.

Another method for preparing multimer polypeptides of the invention involves use of polypeptides of the invention fused to a leucine zipper or isoleucine zipper polypeptide sequence. Leucine zipper and isoleucine zipper domains are polypeptides that promote multimerization of the proteins in which they are found. Leucine zippers were originally identified in several DNA-binding proteins (Landschulz et al., Science 240:1759, (1988)), and have since been found in a variety of different proteins. Among the known leucine zippers are naturally occurring peptides and derivatives thereof that dimerize or trimerize. Examples of leucine zipper domains suitable for producing soluble multimeric proteins of the

invention are those described in PCT application WO 94/10308, hereby incorporated by reference. Recombinant fusion proteins comprising a polypeptide of the invention fused to a polypeptide sequence that dimerizes or trimerizes in solution are expressed in suitable host cells, and the resulting soluble multimeric fusion protein is recovered from the culture supernatant using techniques known in the art.

Trimeric polypeptides of the invention may offer the advantage of enhanced biological activity. Preferred leucine zipper moieties and isoleucine moieties are those that preferentially form trimers. One example is a leucine zipper derived from lung surfactant protein D (SPD), as described in Hoppe et al. (FEBS Letters 344:191, (1994)) and in U.S. patent application Ser. No. 08/446,922, hereby incorporated by reference. Other peptides derived from naturally occurring trimeric proteins may be employed in preparing trimeric polypeptides of the invention.

In another example, proteins of the invention are associated by interactions between Flag® polypeptide sequence contained in fusion proteins of the invention containing Flag® polypeptide seuqence. In a further embodiment, associations proteins of the invention are associated by interactions between heterologous polypeptide sequence contained in Flag® fusion proteins of the invention and anti-Flag® antibody.

The multimers of the invention may be generated using chemical techniques known in the art. For example, polypeptides desired to be contained in the multimers of the invention may be chemically cross-linked using linker molecules and linker molecule length optimization techniques known in the art (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). Additionally, multimers of the invention may be generated using techniques known in the art to form one or more inter-molecule cross-links between the cysteine residues located within the sequence of the polypeptides desired to be contained in the multimer (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). Further, polypeptides of the invention may be routinely modified by the addition of cysteine or biotin to the C-terminus or N-terminus of the polypeptide and techniques known in the art may be applied to generate multimers containing one or more of these modified polypeptides (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). Additionally, techniques known in the art may be applied to generate liposomes containing the polypeptide

components desired to be contained in the multimer of the invention (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety).

Alternatively, multimers of the invention may be generated using genetic engineering techniques known in the art. In one embodiment, polypeptides contained in multimers of the invention are produced recombinantly using fusion protein technology described herein or otherwise known in the art (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). In a specific embodiment, polynucleotides coding for a homodimer of the invention are generated by ligating a polynucleotide sequence encoding a polypeptide of the invention to a sequence encoding a linker polypeptide and then further to a synthetic polynucleotide encoding the translated product of the polypeptide in the reverse orientation from the original C-terminus to the N-terminus (lacking the leader sequence) (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). In another embodiment, recombinant techniques described herein or otherwise known in the art are applied to generate recombinant polypeptides of the invention which contain a transmembrane domain (or hyrophobic or signal peptide) and which can be incorporated by membrane reconstitution techniques into liposomes (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety).

Antibodies

Further polypeptides of the invention relate to antibodies and T-cell antigen receptors (TCR) which immunospecifically bind a polypeptide, polypeptide fragment, or variant of SEQ ID NO:Y, and/or an epitope, of the present invention (as determined by immunoassays well known in the art for assaying specific antibody-antigen binding). Antibodies of the invention include, but are not limited to, polyclonal, monoclonal, multispecific, human, humanized or chimeric antibodies, single chain antibodies, Fab fragments, F(ab') fragments, fragments produced by a Fab expression library, anti-idiotypic (anti-Id) antibodies (including, e.g., anti-Id antibodies to antibodies of the invention), and epitope-binding fragments of any of the above. The term "antibody," as used herein, refers to immunoglobulin molecules and immunologically active portions of immunoglobulin molecules, i.e., molecules that contain an antigen binding site that immunospecifically binds an antigen. The immunoglobulin molecules of the invention can be of any type (e.g., IgG,

IgE, IgM. IgD, IgA and IgY), class (e.g., IgG1, IgG2, IgG3, IgG4. IgA1 and IgA2) or subclass of immunoglobulin molecule.

Most preferably the antibodies are human antigen-binding antibody fragments of the present invention and include. but are not limited to, Fab, Fab' and F(ab')2, Fd, single-chain Fvs (scFv). single-chain antibodies, disulfide-linked Fvs (sdFv) and fragments comprising either a VL or VH domain. Antigen-binding antibody fragments. including single-chain antibodies. may comprise the variable region(s) alone or in combination with the entirety or a portion of the following: hinge region, CH1, CH2, and CH3 domains. Also included in the invention are antigen-binding fragments also comprising any combination of variable region(s) with a hinge region. CH1, CH2, and CH3 domains. The antibodies of the invention may be from any animal origin including birds and mammals. Preferably, the antibodies are human. murine (e.g., mouse and rat), donkey, ship rabbit. goat, guinea pig, camel. horse, or chicken. As used herein, "human" antibodies include antibodies having the amino acid sequence of a human immunoglobulin and include antibodies isolated from human immunoglobulin libraries or from animals transgenic for one or more human immunoglobulin and that do not express endogenous immunoglobulins, as described infra and, for example in, U.S. Patent No. 5,939,598 by Kucherlapati et al.

The antibodies of the present invention may be monospecific, bispecific, trispecific or of greater multispecificity. Multispecific antibodies may be specific for different epitopes of a polypeptide of the present invention or may be specific for both a polypeptide of the present invention as well as for a heterologous epitope, such as a heterologous polypeptide or solid support material. See, e.g., PCT publications WO 93/17715; WO 92/08802; WO 91/00360; WO 92/05793; Tutt, et al., J. Immunol. 147:60-69 (1991); U.S. Patent Nos. 4,474,893; 4,714,681; 4,925,648; 5,573,920; 5,601,819; Kostelny et al., J. Immunol. 148:1547-1553 (1992).

Antibodies of the present invention may be described or specified in terms of the epitope(s) or portion(s) of a polypeptide of the present invention which they recognize or specifically bind. The epitope(s) or polypeptide portion(s) may be specified as described herein, e.g., by N-terminal and C-terminal positions, or by size in contiguous amino acid residues. Antibodies which specifically bind any epitope or polypeptide of the present invention may also be excluded. Therefore, the present invention includes antibodies that

specifically bind polypeptides of the present invention, and allows for the exclusion of the same.

Antibodies of the present invention may also be described or specified in terms of their cross-reactivity. Antibodies that do not bind any other analog, ortholog, or homolog of a polypeptide of the present invention are included. Antibodies that bind polypeptides with at least 95%, at least 90%, at least 85%, at least 80%, at least 75%, at least 70%, at least 65%, at least 60%, at least 55%, and at least 50% identity (as calculated using methods known in the art and described herein) to a polypeptide of the present invention are also included in the present invention. In specific embodiments, antibodies of the present invention cross-react with murine, rat and/or rabbit homologs of human proteins and the corresponding epitopes thereof. Antibodies that do not bind polypeptides with less than 95%, less than 90%, less than 85%, less than 80%, less than 75%, less than 70%, less than 65%, less than 60%, less than 55%, and less than 50% identity (as calculated using methods known in the art and described herein) to a polypeptide of the present invention are also included in the present invention. In a specific embodiment, the above-described cross-reactivity is with respect to any single specific antigenic or immunogenic polypeptide, or combination(s) of 2, 3, 4, 5, or more of the specific antigenic and/or immunogenic polypeptides disclosed herein. Further included in the present invention are antibodies which bind polypeptides encoded by polynucleotides which hybridize to a polynucleotide of the present invention under stringent hybridization conditions (as described herein). Antibodies of the present invention may also be described or specified in terms of their binding affinity to a polypeptide of the invention. Preferred binding affinities include those with a dissociation constant or Kd less than 5 X 10^{-2} M, 10^{-2} M, 5 X 10^{-3} M, 10^{-3} M, 5 X 10^{-4} M, 10^{-4} M, 5 X 10^{-5} M, 10^{-5} M, 5 X 10^{-6} M, 10^{-6}M, 5 X 10^{-7} M, 10^{7} M, 5 X 10^{-8} M, 10^{-8} M, 5 X 10^{-9} M, 10^{-9} M, 5 X 10^{-10} M, 10^{-10} M, 5 X 10^{-11} M, 10^{-11} M, 5 X 10^{-12} M, $^{10-12}$ M, 5 X 10^{-13} M, 10^{-13} M, 5 X 10^{-14} M, 10^{-14} M, 5 X 10^{-15} M, or $^{10-15}$ M.

The invention also provides antibodies that competitively inhibit binding of an antibody to an epitope of the invention as determined by any method known in the art for determining competitive binding, for example, the immunoassays described herein. In preferred embodiments, the antibody competitively inhibits binding to the epitope by at least 95%, at least 90%, at least 85 %, at least 80%, at least 75%, at least 70%, at least 60%, or at least 50%.

Antibodies of the present invention may act as agonists or antagonists of the polypeptides of the present invention. For example, the present invention includes antibodies which disrupt the receptor/ligand interactions with the polypeptides of the invention either partially or fully. Preferrably, antibodies of the present invention bind an antigenic epitope disclosed herein, or a portion thereof. The invention features both receptor-specific antibodies and ligand-specific antibodies. The invention also features receptor-specific antibodies which do not prevent ligand binding but prevent receptor activation. Receptor activation (i.e., signaling) may be determined by techniques described herein or otherwise known in the art. For example, receptor activation can be determined by detecting the phosphorylation (e.g., tyrosine or serine/threonine) of the receptor or its substrate by immunoprecipitation followed by western blot analysis (for example, as described supra). In specific embodiments, antibodies are provided that inhibit ligand activity or receptor activity by at least 95%, at least 90%, at least 85%, at least 80%, at least 75%, at least 70%, at least 60%, or at least 50% of the activity in absence of the antibody.

The invention also features receptor-specific antibodies which both prevent ligand binding and receptor activation as well as antibodies that recognize the receptor-ligand complex, and, preferably, do not specifically recognize the unbound receptor or the unbound ligand. Likewise, included in the invention are neutralizing antibodies which bind the ligand and prevent binding of the ligand to the receptor, as well as antibodies which bind the ligand, thereby preventing receptor activation, but do not prevent the ligand from binding the receptor. Further included in the invention are antibodies which activate the receptor. These antibodies may act as receptor agonists, i.e., potentiate or activate either all or a subset of the biological activities of the ligand-mediated receptor activation, for example, by inducing dimerization of the receptor. The antibodies may be specified as agonists, antagonists or inverse agonists for biological activities comprising the specific biological activities of the peptides of the invention disclosed herein. The above antibody agonists can be made using methods known in the art. See, e.g., PCT publication WO 96/40281; U.S. Patent No. 5,811,097; Deng et al., Blood 92(6):1981-1988 (1998); Chen et al., Cancer Res. 58(16):3668-3678 (1998); Harrop et al., J. Immunol. 161(4):1786-1794 (1998); Zhu et al., Cancer Res. 58(15):3209-3214 (1998); Yoon et al., J. Immunol. 160(7):3170-3179 (1998); Prat et al., J. Cell. Sci. 111(Pt2):237-247 (1998); Pitard et al., J. Immunol. Methods 205(2):177-190 (1997); Liautard et al., Cytokine 9(4):233-241 (1997); Carlson et al., J. Biol.

Chem. 272(17):11295-11301 (1997); Taryman et al., Neuron 14(4):755-762 (1995); Muller et al., Structure 6(9):1153-1167 (1998); Bartunek et al., Cytokine 8(1):14-20 (1996) (which are all incorporated by reference herein in their entireties).

Antibodies of the present invention may be used, for example, but not limited to, to purify, detect, and target the polypeptides of the present invention, including both in vitro and in vivo diagnostic and therapeutic methods. For example, the antibodies have use in immunoassays for qualitatively and quantitatively measuring levels of the polypeptides of the present invention in biological samples. See. e.g., Harlow et al., Antibodies: A Laboratory Manual. (Cold Spring Harbor Laboratory Press, 2nd ed. 1988) (incorporated by reference herein in its entirety).

As discussed in more detail below, the antibodies of the present invention may be used either alone or in combination with other compositions. The antibodies may further be recombinantly fused to a heterologous polypeptide at the N- or C-terminus or chemically conjugated (including covalently and non-covalently conjugations) to polypeptides or other compositions. For example, antibodies of the present invention may be recombinantly fused or conjugated to molecules useful as labels in detection assays and effector molecules such as heterologous polypeptides, drugs, radionuclides, or toxins. See, e.g., PCT publications WO 92/08495; WO 91/14438; WO 89/12624; U.S. Patent No. 5,314,995; and EP 396,387.

The antibodies of the invention include derivatives that are modified, i.e, by the covalent attachment of any type of molecule to the antibody such that covalent attachment does not prevent the antibody from generating an anti-idiotypic response. For example, but not by way of limitation, the antibody derivatives include antibodies that have been modified, e.g., by glycosylation, acetylation, pegylation, phosphylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to a cellular ligand or other protein, etc. Any of numerous chemical modifications may be carried out by known techniques, including, but not limited to specific chemical cleavage, acetylation, formylation, metabolic synthesis of tunicamycin, etc. Additionally, the derivative may contain one or more non-classical amino acids.

The antibodies of the present invention may be generated by any suitable method known in the art. Polyclonal antibodies to an antigen-of- interest can be produced by various procedures well known in the art. For example, a polypeptide of the invention can be administered to various host animals including, but not limited to, rabbits. mice, rats, etc. to

induce the production of sera containing polyclonal antibodies specific for the antigen. Various adjuvants may be used to increase the immunological response, depending on the host species, and include but are not limited to, Freund's (complete and incomplete), mineral gels such as aluminum hydroxide, surface active substances such as lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, keyhole limpet hemocyanins, dinitrophenol, and potentially useful human adjuvants such as BCG (bacille Calmette-Guerin) and corynebacterium parvum. Such adjuvants are also well known in the art.

Monoclonal antibodies can be prepared using a wide variety of techniques known in the art including the use of hybridoma, recombinant, and phage display technologies, or a combination thereof. For example, monoclonal antibodies can be produced using hybridoma techniques including those known in the art and taught, for example, in Harlow et al., Antibodies: A Laboratory Manual, (Cold Spring Harbor Laboratory Press, 2nd ed. 1988); Hammerling, et al., in: Monoclonal Antibodies and T-Cell Hybridomas 563-681 (Elsevier, N.Y., 1981) (said references incorporated by reference in their entireties). The term "monoclonal antibody" as used herein is not limited to antibodies produced through hybridoma technology. The term "monoclonal antibody" refers to an antibody that is derived from a single clone, including any eukaryotic, prokaryotic, or phage clone, and not the method by which it is produced.

Methods for producing and screening for specific antibodies using hybridoma technology are routine and well known in the art and are discussed in detail in the Examples. In a non-limiting example, mice can be immunized with a polypeptide of the invention or a cell expressing such peptide. Once an immune response is detected, e.g., antibodies specific for the antigen are detected in the mouse serum, the mouse spleen is harvested and splenocytes isolated. The splenocytes are then fused by well known techniques to any suitable myeloma cells, for example cells from cell line SP20 available from the ATCC. Hybridomas are selected and cloned by limited dilution. The hybridoma clones are then assayed by methods known in the art for cells that secrete antibodies capable of binding a polypeptide of the invention. Ascites fluid, which generally contains high levels of antibodies, can be generated by immunizing mice with positive hybridoma clones.

Accordingly, the present invention provides methods of generating monoclonal antibodies as well as antibodies produced by the method comprising culturing a hybridoma cell secreting an antibody of the invention wherein, preferably, the hybridoma is generated by

fusing splenocytes isolated from a mouse immunized with an antigen of the invention with myeloma cells and then screening the hybridomas resulting from the fusion for hybridoma clones that secrete an antibody able to bind a polypeptide of the invention.

Antibody fragments which recognize specific epitopes may be generated by known techniques. For example, Fab and F(ab')2 fragments of the invention may be produced by proteolytic cleavage of immunoglobulin molecules, using enzymes such as papain (to produce Fab fragments) or pepsin (to produce F(ab')2 fragments). F(ab')2 fragments contain the variable region, the light chain constant region and the CH1 domain of the heavy chain.

For example, the antibodies of the present invention can also be generated using various phage display methods known in the art. In phage display methods, functional antibody domains are displayed on the surface of phage particles which carry the polynucleotide sequences encoding them. In a particular embodiment, such phage can be utilized to display antigen binding domains expressed from a repertoire or combinatorial antibody library (e.g., human or murine). Phage expressing an antigen binding domain that binds the antigen of interest can be selected or identified with antigen, e.g., using labeled antigen or antigen bound or captured to a solid surface or bead. Phage used in these methods are typically filamentous phage including fd and M13 binding domains expressed from phage with Fab, Fv or disulfide stabilized Fv antibody domains recombinantly fused to either the phage gene III or gene VIII protein. Examples of phage display methods that can be used to make the antibodies of the present invention include those disclosed in Brinkman et al., J. Immunol. Methods 182:41-50 (1995); Ames et al., J. Immunol. Methods 184:177-186 (1995); Kettleborough et al., Eur. J. Immunol. 24:952-958 (1994); Persic et al., Gene 187 9-18 (1997); Burton et al., Advances in Immunology 57:191-280 (1994); PCT application No. PCT/GB91/01134; PCT publications WO 90/02809; WO 91/10737; WO 92/01047; WO 92/18619; WO 93/11236; WO 95/15982; WO 95/20401; and U.S. Patent Nos. 5,698,426; 5,223,409; 5,403,484; 5,580,717; 5,427,908; 5,750,753; 5,821,047; 5,571,698; 5,427,908; 5,516,637; 5,780,225; 5,658,727; 5,733,743 and 5,969,108; each of which is incorporated herein by reference in its entirety.

As described in the above references, after phage selection, the antibody coding regions from the phage can be isolated and used to generate whole antibodies, including human antibodies, or any other desired antigen binding fragment, and expressed in any desired host, including mammalian cells, insect cells, plant cells, yeast, and bacteria, e.g., as

described in detail below. For example, techniques to recombinantly produce Fab. Fab' and F(ab')2 fragments can also be employed using methods known in the art such as those disclosed in PCT publication WO 92/22324; Mullinax et al., BioTechniques 12(6):864-869 (1992); and Sawai et al., AJRI 34:26-34 (1995); and Better et al., Science 240:1041-1043 (1988) (said references incorporated by reference in their entireties).

Examples of techniques which can be used to produce single-chain Fvs and antibodies include those described in U.S. Patents 4,946,778 and 5,258,498; Huston et al.. Methods in Enzymology 203:46-88 (1991); Shu et al., PNAS 90:7995-7999 (1993); and Skerra et al., Science 240:1038-1040 (1988). For some uses, including in vivo use of antibodies in humans and in vitro detection assays, it may be preferable to use chimeric, humanized. or human antibodies. A chimeric antibody is a molecule in which different portions of the antibody are derived from different animal species, such as antibodies having a variable region derived from a murine monoclonal antibody and a human immunoglobulin constant region. Methods for producing chimeric antibodies are known in the art. See e.g., Morrison, Science 229:1202 (1985); Oi et al., BioTechniques 4:214 (1986); Gillies et al., (1989) J. Immunol. Methods 125:191-202; U.S. Patent Nos. 5,807,715; 4,816,567; and 4,816397, which are incorporated herein by reference in their entirety. Humanized antibodies are antibody molecules from non-human species antibody that binds the desired antigen having one or more complementarity determining regions (CDRs) from the non-human species and a framework regions from a human immunoglobulin molecule. Often, framework residues in the human framework regions will be substituted with the corresponding residue from the CDR donor antibody to alter, preferably improve, antigen binding. These framework substitutions are identified by methods well known in the art, e.g., by modeling of the interactions of the CDR and framework residues to identify framework residues important for antigen binding and sequence comparison to identify unusual framework residues at particular positions. (See, e.g., Queen et al., U.S. Patent No. 5,585,089; Riechmann et al., Nature 332:323 (1988), which are incorporated herein by reference in their entireties.) Antibodies can be humanized using a variety of techniques known in the art including, for example, CDR-grafting (EP 239,400; PCT publication WO 91/09967; U.S. Patent Nos. 5.225.539; 5,530,101: and 5,585.089), veneering or resurfacing (EP 592,106; EP 519,596; Padlan, Molecular Immunology 28(4/5):489-498 (1991); Studnicka et al., Protein

Engineering 7(6):805-814 (1994); Roguska. et al., PNAS 91:969-973 (1994)), and chain shuffling (U.S. Patent No. 5,565,332).

Completely human antibodies are particularly desirable for therapeutic treatment of human patients. Human antibodies can be made by a variety of methods known in the art including phage display methods described above using antibody libraries derived from human immunoglobulin sequences. See also. U.S. Patent Nos. 4,444,887 and 4,716,111; and PCT publications WO 98/46645, WO 98/50433, WO 98/24893, WO 98/16654, WO 96/34096. WO 96/33735, and WO 91/10741; each of which is incorporated herein by reference in its entirety.

Human antibodies can also be produced using transgenic mice which are incapable of expressing functional endogenous immunoglobulins, but which can express human immunoglobulin genes. For example, the human heavy and light chain immunoglobulin gene complexes may be introduced randomly or by homologous recombination into mouse embryonic stem cells. Alternatively, the human variable region, constant region, and diversity region may be introduced into mouse embryonic stem cells in addition to the human heavy and light chain genes. The mouse heavy and light chain immunoglobulin genes may be rendered non-functional separately or simultaneously with the introduction of human immunoglobulin loci by homologous recombination. In particular, homozygous deletion of the JH region prevents endogenous antibody production. The modified embryonic stem cells are expanded and microinjected into blastocysts to produce chimeric mice. The chimeric mice are then bred to produce homozygous offspring which express human antibodies. The transgenic mice are immunized in the normal fashion with a selected antigen, e.g., all or a portion of a polypeptide of the invention. Monoclonal antibodies directed against the antigen can be obtained from the immunized, transgenic mice using conventional hybridoma technology. The human immunoglobulin transgenes harbored by the transgenic mice rearrange during B cell differentiation, and subsequently undergo class switching and somatic mutation. Thus, using such a technique, it is possible to produce therapeutically useful IgG, IgA, IgM and IgE antibodies. For an overview of this technology for producing human antibodies, see Lonberg and Huszar, Int. Rev. Immunol. 13:65-93 (1995). For a detailed discussion of this technology for producing human antibodies and human monoclonal antibodies and protocols for producing such antibodies, see, e.g., PCT publications WO 98/24893; WO 92/01047; WO 96/34096; WO 96/33735; European Patent

No. 0 598 877; U.S. Patent Nos. 5,413,923; 5,625,126; 5,633,425; 5,569,825; 5,661,016; 5,545,806; 5,814,318; 5,885,793; 5,916,771; and 5,939,598, which are incorporated by reference herein in their entirety. In addition, companies such as Abgenix, Inc. (Freemont, CA) and Genpharm (San Jose, CA) can be engaged to provide human antibodies directed against a selected antigen using technology similar to that described above.

Completely human antibodies which recognize a selected epitope can be generated using a technique referred to as "guided selection." In this approach a selected non-human monoclonal antibody, e.g., a mouse antibody, is used to guide the selection of a completely human antibody recognizing the same epitope. (Jespers et al., Bio/technology 12:899-903 (1988)).

Further, antibodies to the polypeptides of the invention can, in turn, be utilized to generate anti-idiotype antibodies that "mimic" polypeptides of the invention using techniques well known to those skilled in the art. (See, e.g., Greenspan & Bona, FASEB J. 7(5):437-444; (1989) and Nissinoff, J. Immunol. 147(8):2429-2438 (1991)). For example, antibodies which bind to and competitively inhibit polypeptide multimerization and/or binding of a polypeptide of the invention to a ligand can be used to generate anti-idiotypes that "mimic" the polypeptide multimerization and/or binding domain and, as a consequence, bind to and neutralize polypeptide and/or its ligand. Such neutralizing anti-idiotypes or Fab fragments of such anti-idiotypes can be used in therapeutic regimens to neutralize polypeptide ligand. For example, such anti-idiotypic antibodies can be used to bind a polypeptide of the invention and/or to bind its ligands/receptors, and thereby block its biological activity.

Polynucleotides Encoding Antibodies

The invention further provides polynucleotides comprising a nucleotide sequence encoding an antibody of the invention and fragments thereof. The invention also encompasses polynucleotides that hybridize under stringent or alternatively, under lower stringency hybridization conditions, e.g., as defined supra, to polynucleotides that encode an antibody, preferably, that specifically binds to a polypeptide of the invention, preferably, an antibody that binds to a polypeptide having the amino acid sequence of SEQ ID NO:Y.

The polynucleotides may be obtained, and the nucleotide sequence of the polynucleotides determined, by any method known in the art. For example, if the nucleotide sequence of the antibody is known, a polynucleotide encoding the antibody may be

assembled from chemically synthesized oligonucleotides (e.g., as described in Kutmeier et al., BioTechniques 17:242 (1994)), which, briefly, involves the synthesis of overlapping oligonucleotides containing portions of the sequence encoding the antibody, annealing and ligating of those oligonucleotides, and then amplification of the ligated oligonucleotides by PCR.

Alternatively, a polynucleotide encoding an antibody may be generated from nucleic acid from a suitable source. If a clone containing a nucleic acid encoding a particular antibody is not available, but the sequence of the antibody molecule is known, a nucleic acid encoding the immunoglobulin may be chemically synthesized or obtained from a suitable source (e.g., an antibody cDNA library, or a cDNA library generated from, or nucleic acid, preferably poly A+ RNA, isolated from, any tissue or cells expressing the antibody, such as hybridoma cells selected to express an antibody of the invention) by PCR amplification using synthetic primers hybridizable to the 3' and 5' ends of the sequence or by cloning using an oligonucleotide probe specific for the particular gene sequence to identify, e.g., a cDNA clone from a cDNA library that encodes the antibody. Amplified nucleic acids generated by PCR may then be cloned into replicable cloning vectors using any method well known in the art.

Once the nucleotide sequence and corresponding amino acid sequence of the antibody is determined, the nucleotide sequence of the antibody may be manipulated using methods well known in the art for the manipulation of nucleotide sequences, e.g., recombinant DNA techniques, site directed mutagenesis, PCR, etc. (see, for example, the techniques described in Sambrook et al., 1990, Molecular Cloning, A Laboratory Manual, 2d Ed., Cold Spring Harbor Laboratory, Cold Spring Harbor, NY and Ausubel et al., eds., 1998, Current Protocols in Molecular Biology, John Wiley & Sons, NY, which are both incorporated by reference herein in their entireties), to generate antibodies having a different amino acid sequence, for example to create amino acid substitutions, deletions, and/or insertions.

In a specific embodiment, the amino acid sequence of the heavy and/or light chain variable domains may be inspected to identify the sequences of the complementarity determining regions (CDRs) by methods that are well know in the art, e.g., by comparison to known amino acid sequences of other heavy and light chain variable regions to determine the regions of sequence hypervariability. Using routine recombinant DNA techniques, one or more of the CDRs may be inserted within framework regions, e.g., into human framework

regions to humanize a non-human antibody, as described supra. The framework regions may be naturally occurring or consensus framework regions, and preferably human framework regions (see, e.g., Chothia et al., J. Mol. Biol. 278: 457-479 (1998) for a listing of human framework regions). Preferably, the polynucleotide generated by the combination of the framework regions and CDRs encodes an antibody that specifically binds a polypeptide of the invention. Preferably, as discussed supra, one or more amino acid substitutions may be made within the framework regions, and, preferably, the amino acid substitutions improve binding of the antibody to its antigen. Additionally, such methods may be used to make amino acid substitutions or deletions of one or more variable region cysteine residues participating in an intrachain disulfide bond to generate antibody molecules lacking one or more intrachain disulfide bonds. Other alterations to the polynucleotide are encompassed by the present invention and within the skill of the art.

In addition, techniques developed for the production of "chimeric antibodies" (Morrison et al., Proc. Natl. Acad. Sci. 81:851-855 (1984); Neuberger et al., Nature 312:604-608 (1984); Takeda et al., Nature 314:452-454 (1985)) by splicing genes from a mouse antibody molecule of appropriate antigen specificity together with genes from a human antibody molecule of appropriate biological activity can be used. As described supra, a chimeric antibody is a molecule in which different portions are derived from different animal species, such as those having a variable region derived from a murine mAb and a human immunoglobulin constant region, e.g., humanized antibodies.

Alternatively, techniques described for the production of single chain antibodies (U.S. Patent No. 4,946,778; Bird, Science 242:423- 42 (1988); Huston et al., Proc. Natl. Acad. Sci. USA 85:5879-5883 (1988); and Ward et al., Nature 334:544-54 (1989)) can be adapted to produce single chain antibodies. Single chain antibodies are formed by linking the heavy and light chain fragments of the Fv region via an amino acid bridge, resulting in a single chain polypeptide. Techniques for the assembly of functional Fv fragments in E. coli may also be used (Skerra et al., Science 242:1038- 1041 (1988)).

Methods of Producing Antibodies

The antibodies of the invention can be produced by any method known in the art for the synthesis of antibodies, in particular, by chemical synthesis or preferably, by recombinant expression techniques.

Recombinant expression of an antibody of the invention. or fragment. derivative or analog thereof, (e.g., a heavy or light chain of an antibody of the invention or a single chain antibody of the invention), requires construction of an expression vector containing a polynucleotide that encodes the antibody. Once a polynucleotide encoding an antibody molecule or a heavy or light chain of an antibody, or portion thereof (preferably containing the heavy or light chain variable domain), of the invention has been obtained, the vector for the production of the antibody molecule may be produced by recombinant DNA technology using techniques well known in the art. Thus, methods for preparing a protein by expressing a polynucleotide containing an antibody encoding nucleotide sequence are described herein. Methods which are well known to those skilled in the art can be used to construct expression vectors containing antibody coding sequences and appropriate transcriptional and translational control signals. These methods include. for example. in vitro recombinant DNA techniques, synthetic techniques, and in vivo genetic recombination. The invention, thus, provides replicable vectors comprising a nucleotide sequence encoding an antibody molecule of the invention, or a heavy or light chain thereof, or a heavy or light chain variable domain, operably linked to a promoter. Such vectors may include the nucleotide sequence encoding the constant region of the antibody molecule (see, e.g., PCT Publication WO 86/05807; PCT Publication WO 89/01036; and U.S. Patent No. 5,122,464) and the variable domain of the antibody may be cloned into such a vector for expression of the entire heavy or light chain.

The expression vector is transferred to a host cell by conventional techniques and the transfected cells are then cultured by conventional techniques to produce an antibody of the invention. Thus, the invention includes host cells containing a polynucleotide encoding an antibody of the invention, or a heavy or light chain thereof, or a single chain antibody of the invention, operably linked to a heterologous promoter. In preferred embodiments for the expression of double-chained antibodies, vectors encoding both the heavy and light chains may be co-expressed in the host cell for expression of the entire immunoglobulin molecule, as detailed below.

A variety of host-expression vector systems may be utilized to express the antibody molecules of the invention. Such host-expression systems represent vehicles by which the coding sequences of interest may be produced and subsequently purified, but also represent cells which may, when transformed or transfected with the appropriate nucleotide coding sequences. express an antibody molecule of the invention in situ. These include but are not

limited to microorganisms such as bacteria (e.g., E. coli, B. subtilis) transformed with recombinant bacteriophage DNA, plasmid DNA or cosmid DNA expression vectors containing antibody coding sequences; yeast (e.g., Saccharomyces, Pichia) transformed with recombinant yeast expression vectors containing antibody coding sequences; insect cell systems infected with recombinant virus expression vectors (e.g., baculovirus) containing antibody coding sequences; plant cell systems infected with recombinant virus expression vectors (e.g., cauliflower mosaic virus, CaMV; tobacco mosaic virus, TMV) or transformed with recombinant plasmid expression vectors (e.g., Ti plasmid) containing antibody coding sequences; or mammalian cell systems (e.g., COS, CHO, BHK, 293, 3T3 cells) harboring recombinant expression constructs containing promoters derived from the genome of mammalian cells (e.g., metallothionein promoter) or from mammalian viruses (e.g., the adenovirus late promoter; the vaccinia virus 7.5K promoter). Preferably, bacterial cells such as Escherichia coli, and more preferably, eukaryotic cells, especially for the expression of whole recombinant antibody molecule, are used for the expression of a recombinant antibody molecule. For example, mammalian cells such as Chinese hamster ovary cells (CHO), in conjunction with a vector such as the major intermediate early gene promoter element from human cytomegalovirus is an effective expression system for antibodies (Foecking et al., Gene 45:101 (1986); Cockett et al., Bio/Technology 8:2 (1990)).

In bacterial systems, a number of expression vectors may be advantageously selected depending upon the use intended for the antibody molecule being expressed. For example, when a large quantity of such a protein is to be produced, for the generation of pharmaceutical compositions of an antibody molecule, vectors which direct the expression of high levels of fusion protein products that are readily purified may be desirable. Such vectors include, but are not limited, to the E. coli expression vector pUR278 (Ruther et al., EMBO J. 2:1791 (1983)), in which the antibody coding sequence may be ligated individually into the vector in frame with the lac Z coding region so that a fusion protein is produced; pIN vectors (Inouye & Inouye, Nucleic Acids Res. 13:3101-3109 (1985); Van Heeke & Schuster, J. Biol. Chem. 24:5503-5509 (1989)); and the like. pGEX vectors may also be used to express foreign polypeptides as fusion proteins with glutathione S-transferase (GST). In general, such fusion proteins are soluble and can easily be purified from lysed cells by adsorption and binding to matrix glutathione-agarose beads followed by elution in the presence of free

glutathione. The pGEX vectors are designed to include thrombin or factor Xa protease cleavage sites so that the cloned target gene product can be released from the GST moiety.

In an insect system. Autographa californica nuclear polyhedrosis virus (AcNPV) is used as a vector to express foreign genes. The virus grows in *Spodoptera frugiperda* cells. The antibody coding sequence may be cloned individually into non-essential regions (for example the polyhedrin gene) of the virus and placed under control of an AcNPV promoter (for example the polyhedrin promoter).

In mammalian host cells, a number of viral-based expression systems may be utilized. In cases where an adenovirus is used as an expression vector, the antibody coding sequence of interest may be ligated to an adenovirus transcription/translation control complex, e.g., the late promoter and tripartite leader sequence. This chimeric gene may then be inserted in the adenovirus genome by in vitro or in vivo recombination. Insertion in a non- essential region of the viral genome (e.g., region E1 or E3) will result in a recombinant virus that is viable and capable of expressing the antibody molecule in infected hosts. (e.g., see Logan & Shenk, Proc. Natl. Acad. Sci. USA 81:355-359 (1984)). Specific initiation signals may also be required for efficient translation of inserted antibody coding sequences. These signals include the ATG initiation codon and adjacent sequences. Furthermore, the initiation codon must be in phase with the reading frame of the desired coding sequence to ensure translation of the entire insert. These exogenous translational control signals and initiation codons can be of a variety of origins, both natural and synthetic. The efficiency of expression may be enhanced by the inclusion of appropriate transcription enhancer elements, transcription terminators, etc. (see Bittner et al., Methods in Enzymol. 153:51-544 (1987)).

In addition, a host cell strain may be chosen which modulates the expression of the inserted sequences, or modifies and processes the gene product in the specific fashion desired. Such modifications (e.g., glycosylation) and processing (e.g., cleavage) of protein products may be important for the function of the protein. Different host cells have characteristic and specific mechanisms for the post-translational processing and modification of proteins and gene products. Appropriate cell lines or host systems can be chosen to ensure the correct modification and processing of the foreign protein expressed. To this end, eukaryotic host cells which possess the cellular machinery for proper processing of the primary transcript, glycosylation, and phosphorylation of the gene product may be used. Such mammalian host cells include but are not limited to CHO, VERY, BHK, Hela, COS,

MDCK, 293, 3T3, WI38, and in particular, breast cancer cell lines such as, for example, BT483, Hs578T, HTB2, BT20 and T47D, and normal mammary gland cell line such as, for example, CRL7030 and Hs578Bst.

For long-term, high-yield production of recombinant proteins, stable expression is preferred. For example, cell lines which stably express the antibody molecule may be engineered. Rather than using expression vectors which contain viral origins of replication, host cells can be transformed with DNA controlled by appropriate expression control elements (e.g., promoter, enhancer, sequences, transcription terminators, polyadenylation sites, etc.), and a selectable marker. Following the introduction of the foreign DNA, engineered cells may be allowed to grow for 1-2 days in an enriched media, and then are switched to a selective media. The selectable marker in the recombinant plasmid confers resistance to the selection and allows cells to stably integrate the plasmid into their chromosomes and grow to form foci which in turn can be cloned and expanded into cell lines. This method may advantageously be used to engineer cell lines which express the antibody molecule. Such engineered cell lines may be particularly useful in screening and evaluation of compounds that interact directly or indirectly with the antibody molecule.

A number of selection systems may be used, including but not limited to the herpes simplex virus thymidine kinase (Wigler et al., Cell 11:223 (1977)), hypoxanthine-guanine phosphoribosyltransferase (Szybalska & Szybalski, Proc. Natl. Acad. Sci. USA 48:202 (1992)), and adenine phosphoribosyltransferase (Lowy et al., Cell 22:817 (1980)) genes can be employed in tk-, hgprt- or aprt- cells, respectively. Also, antimetabolite resistance can be used as the basis of selection for the following genes: dhfr, which confers resistance to methotrexate (Wigler et al., Natl. Acad. Sci. USA 77:357 (1980); O'Hare et al., Proc. Natl. Acad. Sci. USA 78:1527 (1981)); gpt, which confers resistance to mycophenolic acid (Mulligan & Berg, Proc. Natl. Acad. Sci. USA 78:2072 (1981)); neo, which confers resistance to the aminoglycoside G-418 Clinical Pharmacy 12:488-505; Wu and Wu, Biotherapy 3:87-95 (1991); Tolstoshev, Ann. Rev. Pharmacol. Toxicol. 32:573-596 (1993); Mulligan, Science 260:926-932 (1993); and Morgan and Anderson, Ann. Rev. Biochem. 62:191-217 (1993); May, 1993, TIB TECH 11(5):155-215); and hygro, which confers resistance to hygromycin (Santerre et al., Gene 30:147 (1984)). Methods commonly known in the art of recombinant DNA technology may be routinely applied to select the desired recombinant clone, and such methods are described, for example, in Ausubel et al. (eds.),

Current Protocols in Molecular Biology, John Wiley & Sons, NY (1993); Kriegler, Gene Transfer and Expression, A Laboratory Manual, Stockton Press, NY (1990); and in Chapters 12 and 13, Dracopoli et al. (eds), Current Protocols in Human Genetics, John Wiley & Sons, NY (1994); Colberre-Garapin et al., J. Mol. Biol. 150:1 (1981), which are incorporated by reference herein in their entireties.

The expression levels of an antibody molecule can be increased by vector amplification (for a review, see Bebbington and Hentschel, The use of vectors based on gene amplification for the expression of cloned genes in mammalian cells in DNA cloning, Vol.3. (Academic Press, New York, 1987)). When a marker in the vector system expressing antibody is amplifiable, increase in the level of inhibitor present in culture of host cell will increase the number of copies of the marker gene. Since the amplified region is associated with the antibody gene, production of the antibody will also increase (Crouse et al., Mol. Cell. Biol. 3:257 (1983)).

The host cell may be co-transfected with two expression vectors of the invention, the first vector encoding a heavy chain derived polypeptide and the second vector encoding a light chain derived polypeptide. The two vectors may contain identical selectable markers which enable equal expression of heavy and light chain polypeptides. Alternatively, a single vector may be used which encodes, and is capable of expressing, both heavy and light chain polypeptides. In such situations, the light chain should be placed before the heavy chain to avoid an excess of toxic free heavy chain (Proudfoot, Nature 322:52 (1986); Kohler, Proc. Natl. Acad. Sci. USA 77:2197 (1980)). The coding sequences for the heavy and light chains may comprise cDNA or genomic DNA.

Once an antibody molecule of the invention has been produced by an animal, chemically synthesized, or recombinantly expressed, it may be purified by any method known in the art for purification of an immunoglobulin molecule, for example, by chromatography (e.g., ion exchange, affinity, particularly by affinity for the specific antigen after Protein A, and sizing column chromatography), centrifugation, differential solubility, or by any other standard technique for the purification of proteins. In addition, the antibodies of the present invention or fragments thereof can be fused to heterologous polypeptide sequences described herein or otherwise known in the art, to facilitate purification.

The present invention encompasses antibodies recombinantly fused or chemically conjugated (including both covalently and non-covalently conjugations) to a polypeptide (or

portion thereof, preferably at least 10, 20, 30, 40, 50, 60, 70, 80, 90 or 100 amino acids of the polypeptide) of the present invention to generate fusion proteins. The fusion does not necessarily need to be direct, but may occur through linker sequences. The antibodies may be specific for antigens other than polypeptides (or portion thereof, preferably at least 10, 20, 30, 40, 50, 60, 70, 80, 90 or 100 amino acids of the polypeptide) of the present invention. For example, antibodies may be used to target the polypeptides of the present invention to particular cell types, either in vitro or in vivo, by fusing or conjugating the polypeptides of the present invention to antibodies specific for particular cell surface receptors. Antibodies fused or conjugated to the polypeptides of the present invention may also be used in in vitro immunoassays and purification methods using methods known in the art. See e.g., Harbor et al., supra, and PCT publication WO 93/21232; EP 439,095; Naramura et al., Immunol. Lett. 39:91-99 (1994); U.S. Patent 5,474,981; Gillies et al., PNAS 89:1428-1432 (1992); Fell et al., J. Immunol. 146:2446-2452(1991), which are incorporated by reference in their entireties.

The present invention further includes compositions comprising the polypeptides of the present invention fused or conjugated to antibody domains other than the variable regions. For example, the polypeptides of the present invention may be fused or conjugated to an antibody Fc region, or portion thereof. The antibody portion fused to a polypeptide of the present invention may comprise the constant region, hinge region, CH1 domain, CH2 domain, and CH3 domain or any combination of whole domains or portions thereof. The polypeptides may also be fused or conjugated to the above antibody portions to form multimers. For example, Fc portions fused to the polypeptides of the present invention can form dimers through disulfide bonding between the Fc portions. Higher multimeric forms can be made by fusing the polypeptides to portions of IgA and IgM. Methods for fusing or conjugating the polypeptides of the present invention to antibody portions are known in the art. See, e.g., U.S. Patent Nos. 5,336,603; 5,622,929; 5,359,046; 5,349,053; 5,447,851; 5,112,946; EP 307,434; EP 367,166; PCT publications WO 96/04388; WO 91/06570; Ashkenazi et al., Proc. Natl. Acad. Sci. USA 88:10535-10539 (1991); Zheng et al., J. Immunol. 154:5590-5600 (1995); and Vil et al., Proc. Natl. Acad. Sci. USA 89:11337-11341(1992) (said references incorporated by reference in their entireties).

As discussed, supra, the polypeptides corresponding to a polypeptide, polypeptide fragment, or a variant of SEQ ID NO:Y may be fused or conjugated to the above antibody portions to increase the in vivo half life of the polypeptides or for use in immunoassays using

methods known in the art. Further, the polypeptides corresponding to SEQ ID NO:Y may be fused or conjugated to the above antibody portions to facilitate purification. One reported example describes chimeric proteins consisting of the first two domains of the human CD4-polypeptide and various domains of the constant regions of the heavy or light chains of mammalian immunoglobulins. (EP 394,827; Traunecker et al., Nature 331:84-86 (1988). The polypeptides of the present invention fused or conjugated to an antibody having disulfide- linked dimeric structures (due to the IgG) may also be more efficient in binding and neutralizing other molecules, than the monomeric secreted protein or protein fragment alone. (Fountoulakis et al., J. Biochem. 270:3958-3964 (1995)). In many cases, the Fc part in a fusion protein is beneficial in therapy and diagnosis, and thus can result in, for example, improved pharmacokinetic properties. (EP A 232,262). Alternatively, deleting the Fc part after the fusion protein has been expressed, detected, and purified, would be desired. For example, the Fc portion may hinder therapy and diagnosis if the fusion protein is used as an antigen for immunizations. In drug discovery, for example, human proteins, such as hIL-5, have been fused with Fc portions for the purpose of high-throughput screening assays to identify antagonists of hIL-5. (See, Bennett et al., J. Molecular Recognition 8:52-58 (1995); Johanson et al., J. Biol. Chem. 270:9459-9471 (1995).

Moreover, the antibodies or fragments thereof of the present invention can be fused to marker sequences, such as a peptide to facilitate purification. In preferred embodiments, the marker amino acid sequence is a hexa-histidine peptide, such as the tag provided in a pQE vector (QIAGEN, Inc., 9259 Eton Avenue, Chatsworth, CA, 91311), among others, many of which are commercially available. As described in Gentz et al., Proc. Natl. Acad. Sci. USA 86:821-824 (1989), for instance, hexa-histidine provides for convenient purification of the fusion protein. Other peptide tags useful for purification include, but are not limited to, the "HA" tag, which corresponds to an epitope derived from the influenza hemagglutinin protein (Wilson et al., Cell 37:767 (1984)) and the "flag" tag.

The present invention further encompasses antibodies or fragments thereof conjugated to a diagnostic or therapeutic agent. The antibodies can be used diagnostically to, for example, monitor the development or progression of a tumor as part of a clinical testing procedure to, e.g., determine the efficacy of a given treatment regimen. Detection can be facilitated by coupling the antibody to a detectable substance. Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent

materials, bioluminescent materials, radioactive materials, positron emitting metals using various positron emission tomographies, and nonradioactive paramagnetic metal ions. The detectable substance may be coupled or conjugated either directly to the antibody (or fragment thereof) or indirectly, through an intermediate (such as, for example, a linker known in the art) using techniques known in the art. See, for example, U.S. Patent No. 4,741,900 for metal ions which can be conjugated to antibodies for use as diagnostics according to the present invention. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, beta-galactosidase, or acetylcholinesterase: examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin: examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol: examples of bioluminescent materials include luciferase, luciferin, and aequorin; and examples of suitable radioactive material include 125I, 131I, 111In or 99Tc.

Further, an antibody or fragment thereof may be conjugated to a therapeutic moiety such as a cytotoxin, e.g., a cytostatic or cytocidal agent, a therapeutic agent or a radioactive metal ion, e.g., alpha-emitters such as, for example, 213Bi. A cytotoxin or cytotoxic agent includes any agent that is detrimental to cells. Examples include paclitaxol, cytochalasin B, gramicidin D, ethidium bromide, emetine, mitomycin, etoposide, tenoposide, vincristine, vinblastine, colchicin, doxorubicin, daunorubicin, dihydroxy anthracin dione, mitoxantrone, mithramycin, actinomycin D, 1-dehydrotestosterone, glucocorticoids, procaine, tetracaine, lidocaine, propranolol, and puromycin and analogs or homologs thereof. Therapeutic agents include, but are not limited to, antimetabolites (e.g., methotrexate, 6-mercaptopurine, 6-thioguanine, cytarabine, 5-fluorouracil decarbazine), alkylating agents (e.g., mechlorethamine, thioepa chlorambucil, melphalan, carmustine (BSNU) and lomustine (CCNU), cyclothosphamide, busulfan, dibromomannitol, streptozotocin, mitomycin C, and cis- dichlorodiamine platinum (II) (DDP) cisplatin), anthracyclines (e.g., daunorubicin (formerly daunomycin) and doxorubicin), antibiotics (e.g., dactinomycin (formerly actinomycin), bleomycin, mithramycin, and anthramycin (AMC)), and anti-mitotic agents (e.g., vincristine and vinblastine).

The conjugates of the invention can be used for modifying a given biological response, the therapeutic agent or drug moiety is not to be construed as limited to classical

chemical therapeutic agents. For example, the drug moiety may be a protein or polypeptide possessing a desired biological activity. Such proteins may include, for example, a toxin such as abrin, ricin A, pseudomonas exotoxin, or diphtheria toxin; a protein such as tumor necrosis factor. a-interferon, ß-interferon, nerve growth factor, platelet derived growth factor, tissue plasminogen activator, an apoptotic agent, e.g., TNF-alpha, TNF-beta, AIM I (See, International Publication No. WO 97/33899), AIM II (See, International Publication No. WO 97/34911), Fas Ligand (Takahashi *et al.*, *Int. Immunol.*, *6*:1567-1574 (1994)), VEGI (See, International Publication No. WO 99/23105), a thrombotic agent or an anti- angiogenic agent, e.g., angiostatin or endostatin; or, biological response modifiers such as, for example, lymphokines. interleukin-1 ("IL-1"), interleukin-2 ("IL-2"), interleukin-6 ("IL-6"), granulocyte macrophage colony stimulating factor ("GM-CSF"), granulocyte colony stimulating factor ("G-CSF"), or other growth factors.

Antibodies may also be attached to solid supports, which are particularly useful for immunoassays or purification of the target antigen. Such solid supports include, but are not limited to, glass, cellulose, polyacrylamide, nylon, polystyrene, polyvinyl chloride or polypropylene.

Techniques for conjugating such therapeutic moiety to antibodies are well known, see, e.g., Arnon et al., "Monoclonal Antibodies For Immunotargeting Of Drugs In Cancer Therapy", in Monoclonal Antibodies And Cancer Therapy, Reisfeld et al. (eds.), pp. 243-56 (Alan R. Liss, Inc. 1985); Hellstrom et al., "Antibodies For Drug Delivery", in Controlled Drug Delivery (2nd Ed.), Robinson et al. (eds.), pp. 623-53 (Marcel Dekker, Inc. 1987); Thorpe, "Antibody Carriers Of Cytotoxic Agents In Cancer Therapy: A Review", in Monoclonal Antibodies '84: Biological And Clinical Applications, Pinchera et al. (eds.), pp. 475-506 (1985); "Analysis, Results, And Future Prospective Of The Therapeutic Use Of Radiolabeled Antibody In Cancer Therapy", in Monoclonal Antibodies For Cancer Detection And Therapy, Baldwin et al. (eds.), pp. 303-16 (Academic Press 1985), and Thorpe et al., "The Preparation And Cytotoxic Properties Of Antibody-Toxin Conjugates", Immunol. Rev. 62:119-58 (1982).

Alternatively, an antibody can be conjugated to a second antibody to form an antibody heteroconjugate as described by Segal in U.S. Patent No. 4.676,980, which is incorporated herein by reference in its entirety.

An antibody, with or without a therapeutic moiety conjugated to it, administered alone or in combination with cytotoxic factor(s) and/or cytokine(s) can be used as a therapeutic.

Immunophenotyping

The antibodies of the invention may be utilized for immunophenotyping of cell lines and biological samples. The translation product of the gene of the present invention may be useful as a cell specific marker, or more specifically as a cellular marker that is differentially expressed at various stages of differentiation and/or maturation of particular cell types. Monoclonal antibodies directed against a specific epitope, or combination of epitopes, will allow for the screening of cellular populations expressing the marker. Various techniques can be utilized using monoclonal antibodies to screen for cellular populations expressing the marker(s), and include magnetic separation using antibody-coated magnetic beads, "panning" with antibody attached to a solid matrix (i.e., plate), and flow cytometry (See, e.g., U.S. Patent 5,985,660; and Morrison *et al., Cell, 96*:737-49 (1999)).

These techniques allow for the screening of particular populations of cells, such as might be found with hematological malignancies (i.e. minimal residual disease (MRD) in acute leukemic patients) and "non-self" cells in transplantations to prevent Graft-versus-Host Disease (GVHD). Alternatively, these techniques allow for the screening of hematopoietic stem and progenitor cells capable of undergoing proliferation and/or differentiation, as might be found in human umbilical cord blood.

Assays For Antibody Binding

The antibodies of the invention may be assayed for immunospecific binding by any method known in the art. The immunoassays which can be used include but are not limited to competitive and non-competitive assay systems using techniques such as western blots, radioimmunoassays, ELISA (enzyme linked immunosorbent assay), "sandwich" immunoassays, immunoprecipitation assays, precipitin reactions, gel diffusion precipitin reactions, immunodiffusion assays, agglutination assays, complement-fixation assays, immunoradiometric assays, fluorescent immunoassays, protein A immunoassays, to name but a few. Such assays are routine and well known in the art (see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York,

which is incorporated by reference herein in its entirety). Exemplary immunoassays are described briefly below (but are not intended by way of limitation).

Immunoprecipitation protocols generally comprise lysing a population of cells in a lysis buffer such as RIPA buffer (1% NP-40 or Triton X- 100, 1% sodium deoxycholate, 0.1% SDS, 0.15 M NaCl, 0.01 M sodium phosphate at pH 7.2, 1% Trasylol) supplemented with protein phosphatase and/or protease inhibitors (e.g., EDTA, PMSF, aprotinin, sodium vanadate), adding the antibody of interest to the cell lysate, incubating for a period of time (e.g., 1-4 hours) at 4° C, adding protein A and/or protein G sepharose beads to the cell lysate, incubating for about an hour or more at 4° C, washing the beads in lysis buffer and resuspending the beads in SDS/sample buffer. The ability of the antibody of interest to immunoprecipitate a particular antigen can be assessed by, e.g., western blot analysis. One of skill in the art would be knowledgeable as to the parameters that can be modified to increase the binding of the antibody to an antigen and decrease the background (e.g., pre-clearing the cell lysate with sepharose beads). For further discussion regarding immunoprecipitation protocols see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York at 10.16.1.

Western blot analysis generally comprises preparing protein samples, electrophoresis of the protein samples in a polyacrylamide gel (e.g., 8%- 20% SDS-PAGE depending on the molecular weight of the antigen), transferring the protein sample from the polyacrylamide gel to a membrane such as nitrocellulose, PVDF or nylon, blocking the membrane in blocking solution (e.g., PBS with 3% BSA or non-fat milk), washing the membrane in washing buffer (e.g., PBS-Tween 20), blocking the membrane with primary antibody (the antibody of interest) diluted in blocking buffer, washing the membrane in washing buffer, blocking the membrane with a secondary antibody (which recognizes the primary antibody, e.g., an anti-human antibody) conjugated to an enzymatic substrate (e.g., horseradish peroxidase or alkaline phosphatase) or radioactive molecule (e.g., 32P or 125I) diluted in blocking buffer, washing the membrane in wash buffer, and detecting the presence of the antigen. One of skill in the art would be knowledgeable as to the parameters that can be modified to increase the signal detected and to reduce the background noise. For further discussion regarding western blot protocols see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York at 10.8.1.

ELISAs comprise preparing antigen, coating the well of a 96 well microtiter plate with the antigen, adding the antibody of interest conjugated to a detectable compound such as an enzymatic substrate (e.g., horseradish peroxidase or alkaline phosphatase) to the well and incubating for a period of time, and detecting the presence of the antigen. In ELISAs the antibody of interest does not have to be conjugated to a detectable compound; instead, a second antibody (which recognizes the antibody of interest) conjugated to a detectable compound may be added to the well. Further, instead of coating the well with the antigen, the antibody may be coated to the well. In this case, a second antibody conjugated to a detectable compound may be added following the addition of the antigen of interest to the coated well. One of skill in the art would be knowledgeable as to the parameters that can be modified to increase the signal detected as well as other variations of ELISAs known in the art. For further discussion regarding ELISAs see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York at 11.2.1.

The binding affinity of an antibody to an antigen and the off-rate of an antibody-antigen interaction can be determined by competitive binding assays. One example of a competitive binding assay is a radioimmunoassay comprising the incubation of labeled antigen (e.g., 3H or 125I) with the antibody of interest in the presence of increasing amounts of unlabeled antigen, and the detection of the antibody bound to the labeled antigen. The affinity of the antibody of interest for a particular antigen and the binding off-rates can be determined from the data by scatchard plot analysis. Competition with a second antibody can also be determined using radioimmunoassays. In this case, the antigen is incubated with antibody of interest conjugated to a labeled compound (e.g., 3H or 125I) in the presence of increasing amounts of an unlabeled second antibody.

Therapeutic Uses

The present invention is further directed to antibody-based therapies which involve administering antibodies of the invention to an animal, preferably a mammal, and most preferably a human, patient for treating one or more of the disclosed diseases, disorders, or conditions. Therapeutic compounds of the invention include, but are not limited to, antibodies of the invention (including fragments, analogs and derivatives thereof as described herein) and nucleic acids encoding antibodies of the invention (including fragments, analogs and derivatives thereof and anti-idiotypic antibodies as described herein). The antibodies of

the invention can be used to treat, inhibit or prevent diseases, disorders or conditions associated with aberrant expression and/or activity of a polypeptide of the invention, including, but not limited to, any one or more of the diseases, disorders, or conditions described herein. The treatment and/or prevention of diseases, disorders, or conditions associated with aberrant expression and/or activity of a polypeptide of the invention includes, but is not limited to, alleviating symptoms associated with those diseases, disorders or conditions. Antibodies of the invention may be provided in pharmaceutically acceptable compositions as known in the art or as described herein.

A summary of the ways in which the antibodies of the present invention may be used therapeutically includes binding polynucleotides or polypeptides of the present invention locally or systemically in the body or by direct cytotoxicity of the antibody, e.g. as mediated by complement (CDC) or by effector cells (ADCC). Some of these approaches are described in more detail below. Armed with the teachings provided herein, one of ordinary skill in the art will know how to use the antibodies of the present invention for diagnostic, monitoring or therapeutic purposes without undue experimentation.

The antibodies of this invention may be advantageously utilized in combination with other monoclonal or chimeric antibodies, or with lymphokines or hematopoietic growth factors (such as, e.g., IL-2, IL-3 and IL-7), for example, which serve to increase the number or activity of effector cells which interact with the antibodies.

The antibodies of the invention may be administered alone or in combination with other types of treatments (e.g., radiation therapy, chemotherapy, hormonal therapy, immunotherapy and anti-tumor agents). Generally, administration of products of a species origin or species reactivity (in the case of antibodies) that is the same species as that of the patient is preferred. Thus, in a preferred embodiment, human antibodies, fragments derivatives, analogs, or nucleic acids, are administered to a human patient for therapy or prophylaxis.

It is preferred to use high affinity and/or potent in vivo inhibiting and/or neutralizing antibodies against polypeptides or polynucleotides of the present invention, fragments or regions thereof, for both immunoassays directed to and therapy of disorders related to polynucleotides or polypeptides, including fragments thereof, of the present invention. Such antibodies, fragments, or regions, will preferably have an affinity for polynucleotides or polypeptides of the invention, including fragments thereof. Preferred binding affinities

include those with a dissociation constant or Kd less than 5 X 10^{-2} M, 10^{-2} M, 5 X 10^{-3} M, 10^{-3} M, 5 X 10^{-4} M, 10^{-4} M, 5 X 10^{-5} M, 10^{-5} M, 5 X 10^{-6} M, 10^{-6} M, 5 X 10^{-7} M, 10^{-7} M, 5 X 10^{-8} M, 10^{-8} M, 5 X 10^{-9} M, 10^{-9} M, 5 X 10^{-10} M, 10^{-10} M, 5 X 10^{-11} M, 10^{-11} M, 5 X 10^{-12} M, 10^{-12} M, 5 X 10^{-13} M, 10^{-13} M, 5 X 10^{-14} M, 10^{-14} M, 5 X 10^{-15} M, and 10^{-15} M.

Gene Therapy

In a specific embodiment, nucleic acids comprising sequences encoding antibodies or functional derivatives thereof, are administered to treat, inhibit or prevent a disease or disorder associated with aberrant expression and/or activity of a polypeptide of the invention, by way of gene therapy. Gene therapy refers to therapy performed by the administration to a subject of an expressed or expressible nucleic acid. In this embodiment of the invention, the nucleic acids produce their encoded protein that mediates a therapeutic effect.

Any of the methods for gene therapy available in the art can be used according to the present invention. Exemplary methods are described below.

For general reviews of the methods of gene therapy, see Goldspiel et al., Clinical Pharmacy 12:488-505 (1993); Wu and Wu, Biotherapy 3:87-95 (1991); Tolstoshev, Ann. Rev. Pharmacol. Toxicol. 32:573-596 (1993); Mulligan, Science 260:926-932 (1993); and Morgan and Anderson, Ann. Rev. Biochem. 62:191-217 (1993); May, TIBTECH 11(5):155-215 (1993). Methods commonly known in the art of recombinant DNA technology which can be used are described in Ausubel et al. (eds.), Current Protocols in Molecular Biology, John Wiley & Sons, NY (1993); and Kriegler, Gene Transfer and Expression, A Laboratory Manual, Stockton Press, NY (1990).

In a preferred aspect, the compound comprises nucleic acid sequences encoding an antibody, said nucleic acid sequences being part of expression vectors that express the antibody or fragments or chimeric proteins or heavy or light chains thereof in a suitable host. In particular, such nucleic acid sequences have promoters operably linked to the antibody coding region, said promoter being inducible or constitutive, and, optionally, tissue-specific. In another particular embodiment, nucleic acid molecules are used in which the antibody coding sequences and any other desired sequences are flanked by regions that promote homologous recombination at a desired site in the genome, thus providing for intrachromosomal expression of the antibody encoding nucleic acids (Koller and Smithies, Proc. Natl. Acad. Sci. USA 86:8932-8935 (1989); Zijlstra et al., Nature 342:435-438 (1989).

In specific embodiments, the expressed antibody molecule is a single chain antibody; alternatively, the nucleic acid sequences include sequences encoding both the heavy and light chains, or fragments thereof, of the antibody.

Delivery of the nucleic acids into a patient may be either direct, in which case the patient is directly exposed to the nucleic acid or nucleic acid- carrying vectors, or indirect, in which case, cells are first transformed with the nucleic acids in vitro, then transplanted into the patient. These two approaches are known, respectively, as in vivo or ex vivo gene therapy.

In a specific embodiment, the nucleic acid sequences are directly administered in vivo, where it is expressed to produce the encoded product. This can be accomplished by any of numerous methods known in the art, e.g., by constructing them as part of an appropriate nucleic acid expression vector and administering it so that they become intracellular, e.g., by infection using defective or attenuated retrovirals or other viral vectors (see U.S. Patent No. 4,980,286), or by direct injection of naked DNA, or by use of microparticle bombardment (e.g., a gene gun; Biolistic, Dupont), or coating with lipids or cell-surface receptors or transfecting agents, encapsulation in liposomes, microparticles, or microcapsules, or by administering them in linkage to a peptide which is known to enter the nucleus, by administering it in linkage to a ligand subject to receptor-mediated endocytosis (see, e.g., Wu and Wu, J. Biol. Chem. 262:4429-4432 (1987)) (which can be used to target cell types specifically expressing the receptors), etc. In another embodiment, nucleic acid-ligand complexes can be formed in which the ligand comprises a fusogenic viral peptide to disrupt endosomes, allowing the nucleic acid to avoid lysosomal degradation. In yet another embodiment, the nucleic acid can be targeted in vivo for cell specific uptake and expression, by targeting a specific receptor (see, e.g., PCT Publications WO 92/06180; WO 92/22635; WO92/20316; WO93/14188, WO 93/20221). Alternatively, the nucleic acid can be introduced intracellularly and incorporated within host cell DNA for expression, by homologous recombination (Koller and Smithies, Proc. Natl. Acad. Sci. USA 86:8932-8935 (1989); Zijlstra et al., Nature 342:435-438 (1989)).

In a specific embodiment, viral vectors that contains nucleic acid sequences encoding an antibody of the invention are used. For example, a retroviral vector can be used (see Miller et al., Meth. Enzymol. 217:581-599 (1993)). These retroviral vectors contain the components necessary for the correct packaging of the viral genome and integration into the

host cell DNA. The nucleic acid sequences encoding the antibody to be used in gene therapy are cloned into one or more vectors, which facilitates delivery of the gene into a patient. More detail about retroviral vectors can be found in Boesen et al., Biotherapy 6:291-302 (1994), which describes the use of a retroviral vector to deliver the mdr1 gene to hematopoietic stem cells in order to make the stem cells more resistant to chemotherapy. Other references illustrating the use of retroviral vectors in gene therapy are: Clowes et al., J. Clin. Invest. 93:644-651 (1994); Kiem et al., Blood 83:1467-1473 (1994); Salmons and Gunzberg, Human Gene Therapy 4:129-141 (1993); and Grossman and Wilson, Curr. Opin. in Genetics and Devel. 3:110-114 (1993).

Adenoviruses are other viral vectors that can be used in gene therapy. Adenoviruses are especially attractive vehicles for delivering genes to respiratory epithelia. Adenoviruses naturally infect respiratory epithelia where they cause a mild disease. Other targets for adenovirus-based delivery systems are liver, the central nervous system, endothelial cells, and muscle. Adenoviruses have the advantage of being capable of infecting non-dividing cells. Kozarsky and Wilson, Current Opinion in Genetics and Development 3:499-503 (1993) present a review of adenovirus-based gene therapy. Bout et al., Human Gene Therapy 5:3-10 (1994) demonstrated the use of adenovirus vectors to transfer genes to the respiratory epithelia of rhesus monkeys. Other instances of the use of adenoviruses in gene therapy can be found in Rosenfeld et al., Science 252:431-434 (1991); Rosenfeld et al., Cell 68:143- 155 (1992); Mastrangeli et al., J. Clin. Invest. 91:225-234 (1993); PCT Publication WO94/12649; and Wang, et al., Gene Therapy 2:775-783 (1995). In a preferred embodiment, adenovirus vectors are used.

Adeno-associated virus (AAV) has also been proposed for use in gene therapy (Walsh et al., Proc. Soc. Exp. Biol. Med. 204:289-300 (1993); U.S. Patent No. 5,436,146).

Another approach to gene therapy involves transferring a gene to cells in tissue culture by such methods as electroporation, lipofection, calcium phosphate mediated transfection, or viral infection. Usually, the method of transfer includes the transfer of a selectable marker to the cells. The cells are then placed under selection to isolate those cells that have taken up and are expressing the transferred gene. Those cells are then delivered to a patient.

In this embodiment, the nucleic acid is introduced into a cell prior to administration in vivo of the resulting recombinant cell. Such introduction can be carried out by any method

known in the art. including but not limited to transfection. electroporation, microinjection, infection with a viral or bacteriophage vector containing the nucleic acid sequences, cell fusion. chromosome-mediated gene transfer, microcell-mediated gene transfer. spheroplast fusion, etc. Numerous techniques are known in the art for the introduction of foreign genes into cells (see, e.g., Loeffler and Behr, Meth. Enzymol. 217:599-618 (1993); Cohen et al., Meth. Enzymol. 217:618-644 (1993); Cline, Pharmac. Ther. 29:69-92m (1985) and may be used in accordance with the present invention, provided that the necessary developmental and physiological functions of the recipient cells are not disrupted. The technique should provide for the stable transfer of the nucleic acid to the cell, so that the nucleic acid is expressible by the cell and preferably heritable and expressible by its cell progeny.

The resulting recombinant cells can be delivered to a patient by various methods known in the art. Recombinant blood cells (e.g., hematopoietic stem or progenitor cells) are preferably administered intravenously. The amount of cells envisioned for use depends on the desired effect, patient state, etc., and can be determined by one skilled in the art.

Cells into which a nucleic acid can be introduced for purposes of gene therapy encompass any desired, available cell type, and include but are not limited to epithelial cells, endothelial cells, keratinocytes, fibroblasts, muscle cells, hepatocytes; blood cells such as Tlymphocytes, Blymphocytes, monocytes, macrophages, neutrophils, eosinophils, megakaryocytes, granulocytes; various stem or progenitor cells, in particular hematopoietic stem or progenitor cells, e.g., as obtained from bone marrow, umbilical cord blood, peripheral blood, fetal liver, etc.

In a preferred embodiment, the cell used for gene therapy is autologous to the patient.

In an embodiment in which recombinant cells are used in gene therapy, nucleic acid sequences encoding an antibody are introduced into the cells such that they are expressible by the cells or their progeny, and the recombinant cells are then administered in vivo for therapeutic effect. In a specific embodiment, stem or progenitor cells are used. Any stem and/or progenitor cells which can be isolated and maintained in vitro can potentially be used in accordance with this embodiment of the present invention (see e.g. PCT Publication WO 94/08598; Stemple and Anderson, Cell 71:973-985 (1992); Rheinwald, Meth. Cell Bio. 21A:229 (1980): and Pittelkow and Scott, Mayo Clinic Proc. 61:771 (1986)).

In a specific embodiment, the nucleic acid to be introduced for purposes of gene therapy comprises an inducible promoter operably linked to the coding region, such that

expression of the nucleic acid is controllable by controlling the presence or absence of the appropriate inducer of transcription. Demonstration of Therapeutic or Prophylactic Activity

The compounds or pharmaceutical compositions of the invention are preferably tested in vitro, and then in vivo for the desired therapeutic or prophylactic activity, prior to use in humans. For example, in vitro assays to demonstrate the therapeutic or prophylactic utility of a compound or pharmaceutical composition include, the effect of a compound on a cell line or a patient tissue sample. The effect of the compound or composition on the cell line and/or tissue sample can be determined utilizing techniques known to those of skill in the art including, but not limited to, rosette formation assays and cell lysis assays. In accordance with the invention, in vitro assays which can be used to determine whether administration of a specific compound is indicated, include in vitro cell culture assays in which a patient tissue sample is grown in culture, and exposed to or otherwise administered a compound, and the effect of such compound upon the tissue sample is observed.

Therapeutic/Prophylactic Administration and Composition

The invention provides methods of treatment, inhibition and prophylaxis by administration to a subject of an effective amount of a compound or pharmaceutical composition of the invention, preferably a polypeptide or antibody of the invention. In a preferred aspect, the compound is substantially purified (e.g., substantially free from substances that limit its effect or produce undesired side-effects). The subject is preferably an animal, including but not limited to animals such as cows, pigs, horses, chickens, cats, dogs, etc., and is preferably a mammal, and most preferably human.

Formulations and methods of administration that can be employed when the compound comprises a nucleic acid or an immunoglobulin are described above; additional appropriate formulations and routes of administration can be selected from among those described herein below.

Various delivery systems are known and can be used to administer a compound of the invention, e.g., encapsulation in liposomes, microparticles, microcapsules, recombinant cells capable of expressing the compound, receptor-mediated endocytosis (see, e.g., Wu and Wu, J. Biol. Chem. 262:4429-4432 (1987)), construction of a nucleic acid as part of a retroviral or other vector, etc. Methods of introduction include but are not limited to intradermal, intramuscular, intraperitoneal, intravenous, subcutaneous, intranasal, epidural, and oral

routes. The compounds or compositions may be administered by any convenient route, for example by infusion or bolus injection, by absorption through epithelial or mucocutaneous linings (e.g., oral mucosa, rectal and intestinal mucosa, etc.) and may be administered together with other biologically active agents. Administration can be systemic or local. In addition, it may be desirable to introduce the pharmaceutical compounds or compositions of the invention into the central nervous system by any suitable route, including intraventricular and intrathecal injection; intraventricular injection may be facilitated by an intraventricular catheter, for example, attached to a reservoir, such as an Ommaya reservoir. Pulmonary administration can also be employed, e.g., by use of an inhaler or nebulizer, and formulation with an aerosolizing agent.

In a specific embodiment, it may be desirable to administer the pharmaceutical compounds or compositions of the invention locally to the area in need of treatment; this may be achieved by, for example, and not by way of limitation, local infusion during surgery, topical application, e.g., in conjunction with a wound dressing after surgery, by injection, by means of a catheter, by means of a suppository, or by means of an implant, said implant being of a porous, non-porous, or gelatinous material, including membranes, such as sialastic membranes, or fibers. Preferably, when administering a protein, including an antibody, of the invention, care must be taken to use materials to which the protein does not absorb.

In another embodiment, the compound or composition can be delivered in a vesicle, in particular a liposome (see Langer, Science 249:1527-1533 (1990); Treat et al., in Liposomes in the Therapy of Infectious Disease and Cancer, Lopez-Berestein and Fidler (eds.), Liss, New York, pp. 353- 365 (1989); Lopez-Berestein, ibid., pp. 317-327; see generally ibid.)

In yet another embodiment, the compound or composition can be delivered in a controlled release system. In one embodiment, a pump may be used (see Langer, supra; Sefton, CRC Crit. Ref. Biomed. Eng. 14:201 (1987); Buchwald et al., Surgery 88:507 (1980); Saudek et al., N. Engl. J. Med. 321:574 (1989)). In another embodiment, polymeric materials can be used (see Medical Applications of Controlled Release, Langer and Wise (eds.), CRC Pres., Boca Raton, Florida (1974); Controlled Drug Bioavailability, Drug Product Design and Performance, Smolen and Ball (eds.), Wiley, New York (1984); Ranger and Peppas, J., Macromol. Sci. Rev. Macromol. Chem. 23:61 (1983); see also Levy et al., Science 228:190 (1985); During et al., Ann. Neurol. 25:351 (1989); Howard et al.,

J.Neurosurg. 71:105 (1989)). In yet another embodiment, a controlled release system can be placed in proximity of the therapeutic target, i.e., the brain, thus requiring only a fraction of the systemic dose (see, e.g., Goodson, in Medical Applications of Controlled Release, supra, vol. 2, pp. 115-138 (1984)).

Other controlled release systems are discussed in the review by Langer (Science 249:1527-1533 (1990)).

In a specific embodiment where the compound of the invention is a nucleic acid encoding a protein, the nucleic acid can be administered in vivo to promote expression of its encoded protein. by constructing it as part of an appropriate nucleic acid expression vector and administering it so that it becomes intracellular, e.g., by use of a retroviral vector (see U.S. Patent No. 4.980,286), or by direct injection, or by use of microparticle bombardment (e.g.. a gene gun; Biolistic, Dupont), or coating with lipids or cell-surface receptors or transfecting agents, or by administering it in linkage to a homeobox- like peptide which is known to enter the nucleus (see e.g., Joliot et al., Proc. Natl. Acad. Sci. USA 88:1864-1868 (1991)), etc. Alternatively, a nucleic acid can be introduced intracellularly and incorporated within host cell DNA for expression, by homologous recombination.

The present invention also provides pharmaceutical compositions. Such compositions comprise a therapeutically effective amount of a compound, and a pharmaceutically acceptable carrier. In a specific embodiment, the term "pharmaceutically acceptable" means approved by a regulatory agency of the Federal or a state government or listed in the U.S. Pharmacopeia or other generally recognized pharmacopeia for use in animals, and more particularly in humans. The term "carrier" refers to a diluent, adjuvant, excipient, or vehicle with which the therapeutic is administered. Such pharmaceutical carriers can be sterile liquids, such as water and oils, including those of petroleum, animal, vegetable or synthetic origin, such as peanut oil, soybean oil, mineral oil, sesame oil and the like. Water is a preferred carrier when the pharmaceutical composition is administered intravenously. Saline solutions and aqueous dextrose and glycerol solutions can also be employed as liquid carriers, particularly for injectable solutions. Suitable pharmaceutical excipients include starch, glucose, lactose, sucrose, gelatin, malt, rice, flour, chalk, silica gel, sodium stearate, glycerol monostearate, talc, sodium chloride, dried skim milk, glycerol, propylene, glycol, water, ethanol and the like. The composition, if desired, can also contain minor amounts of wetting or emulsifying agents, or pH buffering agents. These compositions can take the form of

solutions, suspensions, emulsion, tablets, pills, capsules, powders, sustained-release formulations and the like. The composition can be formulated as a suppository, with traditional binders and carriers such as triglycerides. Oral formulation can include standard carriers such as pharmaceutical grades of mannitol, lactose, starch, magnesium stearate, sodium saccharine, cellulose, magnesium carbonate, etc. Examples of suitable pharmaceutical carriers are described in "Remington's Pharmaceutical Sciences" by E.W. Martin. Such compositions will contain a therapeutically effective amount of the compound, preferably in purified form, together with a suitable amount of carrier so as to provide the form for proper administration to the patient. The formulation should suit the mode of administration.

In a preferred embodiment, the composition is formulated in accordance with routine procedures as a pharmaceutical composition adapted for intravenous administration to human beings. Typically, compositions for intravenous administration are solutions in sterile isotonic aqueous buffer. Where necessary, the composition may also include a solubilizing agent and a local anesthetic such as lignocaine to ease pain at the site of the injection. Generally, the ingredients are supplied either separately or mixed together in unit dosage form, for example, as a dry lyophilized powder or water free concentrate in a hermetically sealed container such as an ampoule or sachette indicating the quantity of active agent. Where the composition is to be administered by infusion, it can be dispensed with an infusion bottle containing sterile pharmaceutical grade water or saline. Where the composition is administered by injection, an ampoule of sterile water for injection or saline can be provided so that the ingredients may be mixed prior to administration.

The compounds of the invention can be formulated as neutral or salt forms. Pharmaceutically acceptable salts include those formed with anions such as those derived from hydrochloric, phosphoric, acetic, oxalic, tartaric acids, etc., and those formed with cations such as those derived from sodium, potassium, ammonium, calcium, ferric hydroxides, isopropylamine, triethylamine, 2-ethylamino ethanol, histidine, procaine, etc.

The amount of the compound of the invention which will be effective in the treatment, inhibition and prevention of a disease or disorder associated with aberrant expression and/or activity of a polypeptide of the invention can be determined by standard clinical techniques. In addition, in vitro assays may optionally be employed to help identify optimal dosage ranges. The precise dose to be employed in the formulation will also depend

on the route of administration, and the seriousness of the disease or disorder, and should be decided according to the judgment of the practitioner and each patient's circumstances. Effective doses may be extrapolated from dose-response curves derived from in vitro or animal model test systems.

For antibodies, the dosage administered to a patient is typically 0.1 mg/kg to 100 mg/kg of the patient's body weight. Preferably, the dosage administered to a patient is between 0.1 mg/kg and 20 mg/kg of the patient's body weight, more preferably 1 mg/kg to 10 mg/kg of the patient's body weight. Generally, human antibodies have a longer half-life within the human body than antibodies from other species due to the immune response to the foreign polypeptides. Thus, lower dosages of human antibodies and less frequent administration is often possible. Further, the dosage and frequency of administration of antibodies of the invention may be reduced by enhancing uptake and tissue penetration (e.g., into the brain) of the antibodies by modifications such as, for example, lipidation.

The invention also provides a pharmaceutical pack or kit comprising one or more containers filled with one or more of the ingredients of the pharmaceutical compositions of the invention. Optionally associated with such container(s) can be a notice in the form prescribed by a governmental agency regulating the manufacture, use or sale of pharmaceuticals or biological products, which notice reflects approval by the agency of manufacture, use or sale for human administration.

Diagnosis and Imaging

Labeled antibodies, and derivatives and analogs thereof, which specifically bind to a polypeptide of interest can be used for diagnostic purposes to detect, diagnose, or monitor diseases, disorders, and/or conditions associated with the aberrant expression and/or activity of a polypeptide of the invention. The invention provides for the detection of aberrant expression of a polypeptide of interest, comprising (a) assaying the expression of the polypeptide of interest in cells or body fluid of an individual using one or more antibodies specific to the polypeptide interest and (b) comparing the level of gene expression with a standard gene expression level, whereby an increase or decrease in the assayed polypeptide gene expression level compared to the standard expression level is indicative of aberrant expression.

The invention provides a diagnostic assay for diagnosing a disorder, comprising (a) assaying the expression of the polypeptide of interest in cells or body fluid of an individual using one or more antibodies specific to the polypeptide interest and (b) comparing the level of gene expression with a standard gene expression level, whereby an increase or decrease in the assayed polypeptide gene expression level compared to the standard expression level is indicative of a particular disorder. With respect to cancer, the presence of a relatively high amount of transcript in biopsied tissue from an individual may indicate a predisposition for the development of the disease, or may provide a means for detecting the disease prior to the appearance of actual clinical symptoms. A more definitive diagnosis of this type may allow health professionals to employ preventative measures or aggressive treatment earlier thereby preventing the development or further progression of the cancer.

Antibodies of the invention can be used to assay protein levels in a biological sample using classical immunohistological methods known to those of skill in the art (e.g., see Jalkanen, et al., J. Cell. Biol. 101:976-985 (1985); Jalkanen, et al., J. Cell . Biol. 105:3087-3096 (1987)). Other antibody-based methods useful for detecting protein gene expression include immunoassays, such as the enzyme linked immunosorbent assay (ELISA) and the radioimmunoassay (RIA). Suitable antibody assay labels are known in the art and include enzyme labels, such as, glucose oxidase; radioisotopes, such as iodine (125I, 121I), carbon (14C), sulfur (35S), tritium (3H), indium (112In), and technetium (99Tc); luminescent labels, such as luminol; and fluorescent labels, such as fluorescein and rhodamine, and biotin.

One aspect of the invention is the detection and diagnosis of a disease or disorder associated with aberrant expression of a polypeptide of interest in an animal, preferably a mammal and most preferably a human. In one embodiment, diagnosis comprises: a) administering (for example, parenterally, subcutaneously, or intraperitoneally) to a subject an effective amount of a labeled molecule which specifically binds to the polypeptide of interest; b) waiting for a time interval following the administering for permitting the labeled molecule to preferentially concentrate at sites in the subject where the polypeptide is expressed (and for unbound labeled molecule to be cleared to background level); c) determining background level; and d) detecting the labeled molecule in the subject, such that detection of labeled molecule above the background level indicates that the subject has a particular disease or disorder associated with aberrant expression of the polypeptide of interest. Background level can be determined by various methods including, comparing the

amount of labeled molecule detected to a standard value previously determined for a particular system.

It will be understood in the art that the size of the subject and the imaging system used will determine the quantity of imaging moiety needed to produce diagnostic images. In the case of a radioisotope moiety, for a human subject, the quantity of radioactivity injected will normally range from about 5 to 20 millicuries of 99mTc. The labeled antibody or antibody fragment will then preferentially accumulate at the location of cells which contain the specific protein. In vivo tumor imaging is described in S.W. Burchiel et al., "Immunopharmacokinetics of Radiolabeled Antibodies and Their Fragments." (Chapter 13 in Tumor Imaging: The Radiochemical Detection of Cancer, S.W. Burchiel and B. A. Rhodes, eds., Masson Publishing Inc. (1982).

Depending on several variables, including the type of label used and the mode of administration, the time interval following the administration for permitting the labeled molecule to preferentially concentrate at sites in the subject and for unbound labeled molecule to be cleared to background level is 6 to 48 hours or 6 to 24 hours or 6 to 12 hours. In another embodiment the time interval following administration is 5 to 20 days or 5 to 10 days.

In an embodiment, monitoring of the disease or disorder is carried out by repeating the method for diagnosing the disease or disease, for example, one month after initial diagnosis, six months after initial diagnosis, one year after initial diagnosis, etc.

Presence of the labeled molecule can be detected in the patient using methods known in the art for in vivo scanning. These methods depend upon the type of label used. Skilled artisans will be able to determine the appropriate method for detecting a particular label. Methods and devices that may be used in the diagnostic methods of the invention include, but are not limited to, computed tomography (CT), whole body scan such as position emission tomography (PET), magnetic resonance imaging (MRI), and sonography.

In a specific embodiment, the molecule is labeled with a radioisotope and is detected in the patient using a radiation responsive surgical instrument (Thurston et al., U.S. Patent No. 5,441,050). In another embodiment, the molecule is labeled with a fluorescent compound and is detected in the patient using a fluorescence responsive scanning instrument. In another embodiment, the molecule is labeled with a positron emitting metal and is detected in the patent using positron emission-tomography. In yet another embodiment, the molecule

is labeled with a paramagnetic label and is detected in a patient using magnetic resonance imaging (MRI).

Kits

The present invention provides kits that can be used in the above methods. In one embodiment, a kit comprises an antibody of the invention, preferably a purified antibody, in one or more containers. In a specific embodiment, the kits of the present invention contain a substantially isolated polypeptide comprising an epitope which is specifically immunoreactive with an antibody included in the kit. Preferably, the kits of the present invention further comprise a control antibody which does not react with the polypeptide of interest. In another specific embodiment, the kits of the present invention contain a means for detecting the binding of an antibody to a polypeptide of interest (e.g., the antibody may be conjugated to a detectable substrate such as a fluorescent compound, an enzymatic substrate, a radioactive compound or a luminescent compound, or a second antibody which recognizes the first antibody may be conjugated to a detectable substrate).

In another specific embodiment of the present invention, the kit is a diagnostic kit for use in screening serum containing antibodies specific against proliferative and/or cancerous polynucleotides and polypeptides. Such a kit may include a control antibody that does not react with the polypeptide of interest. Such a kit may include a substantially isolated polypeptide antigen comprising an epitope which is specifically immunoreactive with at least one anti-polypeptide antigen antibody. Further, such a kit includes means for detecting the binding of said antibody to the antigen (e.g., the antibody may be conjugated to a fluorescent compound such as fluorescein or rhodamine which can be detected by flow cytometry). In specific embodiments, the kit may include a recombinantly produced or chemically synthesized polypeptide antigen. The polypeptide antigen of the kit may also be attached to a solid support.

In a more specific embodiment the detecting means of the above-described kit includes a solid support to which said polypeptide antigen is attached. Such a kit may also include a non-attached reporter-labeled anti-human antibody. In this embodiment, binding of the antibody to the polypeptide antigen can be detected by binding of the said reporter-labeled antibody.

In an additional embodiment, the invention includes a diagnostic kit for use in screening serum containing antigens of the polypeptide of the invention. The diagnostic kit includes a substantially isolated antibody specifically immunoreactive with polypeptide or polynucleotide antigens, and means for detecting the binding of the polynucleotide or polypeptide antigen to the antibody. In one embodiment, the antibody is attached to a solid support. In a specific embodiment, the antibody may be a monoclonal antibody. The detecting means of the kit may include a second, labeled monoclonal antibody. Alternatively, or in addition, the detecting means may include a labeled, competing antigen.

In one diagnostic configuration, test serum is reacted with a solid phase reagent having a surface-bound antigen obtained by the methods of the present invention. After binding with specific antigen antibody to the reagent and removing unbound serum components by washing, the reagent is reacted with reporter-labeled anti-human antibody to bind reporter to the reagent in proportion to the amount of bound anti-antigen antibody on the solid support. The reagent is again washed to remove unbound labeled antibody, and the amount of reporter associated with the reagent is determined. Typically, the reporter is an enzyme which is detected by incubating the solid phase in the presence of a suitable fluorometric, luminescent or colorimetric substrate (Sigma, St. Louis, MO).

The solid surface reagent in the above assay is prepared by known techniques for attaching protein material to solid support material, such as polymeric beads, dip sticks, 96-well plate or filter material. These attachment methods generally include non-specific adsorption of the protein to the support or covalent attachment of the protein, typically through a free amine group, to a chemically reactive group on the solid support, such as an activated carboxyl, hydroxyl, or aldehyde group. Alternatively, streptavidin coated plates can be used in conjunction with biotinylated antigen(s).

Thus, the invention provides an assay system or kit for carrying out this diagnostic method. The kit generally includes a support with surface- bound recombinant antigens, and a reporter-labeled anti-human antibody for detecting surface-bound anti-antigen antibody.

Uses of the Polynucleotides

Each of the polynucleotides identified herein can be used in numerous ways as reagents. The following description should be considered exemplary and utilizes known techniques.

The colon cancer antigen polynucleotides of the present invention are useful for chromosome identification. There exists an ongoing need to identify new chromosome markers, since few chromosome marking reagents, based on actual sequence data (repeat polymorphisms), are presently available. Each sequence is specifically targeted to and can hybridize with a particular location on an individual human chromosome, thus each polynucleotide of the present invention can routinely be used as a chromosome marker using techniques known in the art.

Briefly, sequences can be mapped to chromosomes by preparing PCR primers (preferably at least 15 bp (e.g., 15-25 bp) from the sequences shown in SEQ ID NO:X, or the complement thereto. Primers can optionally be selected using computer analysis so that primers do not span more than one predicted exon in the genomic DNA. These primers are then used for PCR screening of somatic cell hybrids containing individual human chromosomes. Only those hybrids containing the human gene corresponding to SEQ ID NO:X will yield an amplified fragment.

Similarly, somatic hybrids provide a rapid method of PCR mapping the polynucleotides to particular chromosomes. Three or more clones can be assigned per day using a single thermal cycler. Moreover, sublocalization of the polynucleotides can be achieved with panels of specific chromosome fragments. Other gene mapping strategies that can be used include in situ hybridization, prescreening with labeled flow-sorted chromosomes, preselection by hybridization to construct chromosome specific-cDNA libraries, and computer mapping techniques (See, e.g., Shuler, Trends Biotechnol 16:456-459 (1998) which is hereby incorporated by reference in its entirety).

Precise chromosomal location of the polynucleotides can also be achieved using fluorescence in situ hybridization (FISH) of a metaphase chromosomal spread. This technique uses polynucleotides as short as 500 or 600 bases; however, polynucleotides 2,000-4,000 bp are preferred. For a review of this technique, see Verma et al., "Human Chromosomes: a Manual of Basic Techniques," Pergamon Press, New York (1988).

For chromosome mapping, the polynucleotides can be used individually (to mark a single chromosome or a single site on that chromosome) or in panels (for marking multiple sites and/or multiple chromosomes).

Thus, the present invention also provides a method for chromosomal localization which involves (a) preparing PCR primers from the polynucleotide sequences in Table 3 and SEQ ID NO:X and (b) screening somatic cell hybrids containing individual chromosomes.

The polynucleotides of the present invention would likewise be useful for radiation hybrid mapping, HAPPY mapping, and long range restriction mapping. For a review of these techniques and others known in the art, see, e.g. Dear, "Genome Mapping: A Practical Approach," IRL Press at Oxford University Press, London (1997); Aydin, J. Mol. Med. 77:691-694 (1999); Hacia et al., Mol. Psychiatry 3:483-492 (1998); Herrick et al., Chromosome Res. 7:409-423 (1999); Hamilton et al., Methods Cell Biol. 62:265-280 (2000); and/or Ott, J. Hered. 90:68-70 (1999) each of which is hereby incorporated by reference in its entirety.

Once a polynucleotide has been mapped to a precise chromosomal location, the physical position of the polynucleotide can be used in linkage analysis. Linkage analysis establishes coinheritance between a chromosomal location and presentation of a particular disease. (Disease mapping data are found, for example, in V. McKusick, Mendelian Inheritance in Man (available on line through Johns Hopkins University Welch Medical Library).) Assuming 1 megabase mapping resolution and one gene per 20 kb, a cDNA precisely localized to a chromosomal region associated with the disease could be one of 50-500 potential causative genes.

Thus, once coinheritance is established, differences in a polynucleotide of the invention and the corresponding gene between affected and unaffected individuals can be examined. First, visible structural alterations in the chromosomes, such as deletions or translocations, are examined in chromosome spreads or by PCR. If no structural alterations exist, the presence of point mutations are ascertained. Mutations observed in some or all affected individuals, but not in normal individuals, indicates that the mutation may cause the disease. However, complete sequencing of the polypeptide and the corresponding gene from several normal individuals is required to distinguish the mutation from a polymorphism. If a new polymorphism is identified, this polymorphic polypeptide can be used for further linkage analysis.

Furthermore, increased or decreased expression of the gene in affected individuals as compared to unaffected individuals can be assessed using the polynucleotides of the

invention. Any of these alterations (altered expression, chromosomal rearrangement, or mutation) can be used as a diagnostic or prognostic marker.

Thus, the invention provides a method of detecting increased or decreased expression levels of the colon cancer polynucleotides in affected individuals as compared to unaffected individuals using polynucleotides of the present invention and techniques known in the art, including but not limited to the method described in Example 11. Any of these alterations (altered expression, chromosomal rearrangement, or mutation) can be used as a diagnostic or prognostic marker.

Thus, the invention also provides a diagnostic method useful during diagnosis of a colon related disorder, including colon cancer, involving measuring the expression level of colon cancer polynucleotides in colon tissue or other cells or body fluid from an individual and comparing the measured gene expression level with a standard colon cancer polynucleotide expression level, whereby an increase or decrease in the gene expression level compared to the standard is indicative of a colon related disorder.

In still another embodiment, the invention includes a kit for analyzing samples for the presence of proliferative and/or cancerous polynucleotides derived from a test subject. In a general embodiment, the kit includes at least one polynucleotide probe containing a nucleotide sequence that will specifically hybridize with a polynucleotide of the invention and a suitable container. In a specific embodiment, the kit includes two polynucleotide probes defining an internal region of the polynucleotide of the invention, where each probe has one strand containing a 31'mer-end internal to the region. In a further embodiment, the probes may be useful as primers for polymerase chain reaction amplification.

Where a diagnosis of a colon related disorder, including, for example, diagnosis of a tumor, has already been made according to conventional methods, the present invention is useful as a prognostic indicator, whereby patients exhibiting enhanced or depressed colon cancer polynucleotide expression will experience a worse clinical outcome relative to patients expressing the gene at a level nearer the standard level.

By "measuring the expression level of colon cancer polynucleotides" is intended qualitatively or quantitatively measuring or estimating the level of the colon cancer polypeptide or the level of the mRNA encoding the colon cancer polypeptide in a first biological sample either directly (e.g., by determining or estimating absolute protein level or mRNA level) or relatively (e.g., by comparing to the colon cancer polypeptide level or

mRNA level in a second biological sample). Preferably, the colon cancer polypeptide level or mRNA level in the first biological sample is measured or estimated and compared to a standard colon cancer polypeptide level or mRNA level, the standard being taken from a second biological sample obtained from an individual not having the colon related disorder or being determined by averaging levels from a population of individuals not having a colon related disorder. As will be appreciated in the art, once a standard colon cancer polypeptide level or mRNA level is known, it can be used repeatedly as a standard for comparison.

By "biological sample" is intended any biological sample obtained from an individual, body fluid, cell line, tissue culture, or other source which contains colon cancer polypeptide or the corresponding mRNA. As indicated, biological samples include body fluids (such as lymph, sera, plasma, urine, bile, synovial fluid and spinal fluid) which contain the colon cancer polypeptide, colon tissue, and other tissue sources found to express the colon cancer polypeptide. Methods for obtaining tissue biopsies and body fluids from mammals are well known in the art. Where the biological sample is to include mRNA, a tissue biopsy is the preferred source.

The method(s) provided above may preferrably be applied in a diagnostic method and/or kits in which polynucleotides and/or polypeptides of the invention are attached to a solid support. In one exemplary method, the support may be a "gene chip" or a "biological chip" as described in US Patents 5,837,832, 5,874,219, and 5,856,174. Further, such a gene chip with colon cancer polynucleotides attached may be used to identify polymorphisms between the colon cancer polynucleotide sequences, with polynucleotides isolated from a test subject. The knowledge of such polymorphisms (i.e. their location, as well as, their existence) would be beneficial in identifying disease loci for many disorders, such as for example, in neural disorders, immune system disorders, muscular disorders, reproductive disorders, gastrointestinal disorders, pulmonary disorders, cardiovascular disorders, renal disorders, proliferative disorders, and/or cancerous diseases and conditions, though most preferably in colon related proliferative, and/or cancerous diseases and conditions. Such a method is described in US Patents 5,858,659 and 5,856,104. The US Patents referenced supra are hereby incorporated by reference in their entirety herein.

The present invention encompasses colon cancer polynucleotides that are chemically synthesized, or reproduced as peptide nucleic acids (PNA), or according to other methods known in the art. The use of PNAs would serve as the preferred form if the polynucleotides

of the invention are incorporated onto a solid support, or gene chip. For the purposes of the present invention, a peptide nucleic acid (PNA) is a polyamide type of DNA analog and the monomeric units for adenine, guanine, thymine and cytosine are available commercially (Perceptive Biosystems). Certain components of DNA, such as phosphorus, phosphorus oxides, or deoxyribose derivatives, are not present in PNAs. As disclosed by P. E. Nielsen, M. Egholm, R. H. Berg and O. Buchardt, Science 254, 1497 (1991); and M. Egholm, O. Buchardt, L.Christensen, C. Behrens, S. M. Freier, D. A. Driver, R. H. Berg, S. K. Kim, B. Norden, and P. E. Nielsen, Nature 365, 666 (1993), PNAs bind specifically and tightly to complementary DNA strands and are not degraded by nucleases. In fact, PNA binds more strongly to DNA than DNA itself does. This is probably because there is no electrostatic repulsion between the two strands, and also the polyamide backbone is more flexible. Because of this, PNA/DNA duplexes bind under a wider range of stringency conditions than DNA/DNA duplexes, making it easier to perform multiplex hybridization. Smaller probes can be used than with DNA due to the strong binding. In addition, it is more likely that single base mismatches can be determined with PNA/DNA hybridization because a single mismatch in a PNA/DNA 15-mer lowers the melting point (T.sub.m) by 8°-20° C, vs. 4°-16° C for the DNA/DNA 15-mer duplex. Also, the absence of charge groups in PNA means that hybridization can be done at low ionic strengths and reduce possible interference by salt during the analysis.

The present invention have uses which include, but are not limited to, detecting cancer in mammals. In particular the invention is useful during diagnosis of pathological cell proliferative neoplasias which include, but are not limited to: acute myelogenous leukemias including acute monocytic leukemia, acute myeloblastic leukemia, acute promyelocytic leukemia, acute myelomonocytic leukemia, acute erythroleukemia, acute megakaryocytic leukemia, and acute undifferentiated leukemia, etc.; and chronic myelogenous leukemias including chronic myelomonocytic leukemia, chronic granulocytic leukemia, etc. Preferred mammals include monkeys, apes, cats, dogs, cows, pigs, horses, rabbits and humans. Particularly preferred are humans.

Pathological cell proliferative disorders are often associated with inappropriate activation of proto-oncogenes. (Gelmann, E. P. et al., "The Etiology of Acute Leukemia: Molecular Genetics and Viral Oncology," in Neoplastic Diseases of the Blood, Vol 1., Wiemik, P. H. et al. eds., 161-182 (1985)). Neoplasias are now believed to result from the

qualitative alteration of a normal cellular gene product, or from the quantitative modification of gene expression by insertion into the chromosome of a viral sequence, by chromosomal translocation of a gene to a more actively transcribed region, or by some other mechanism. (Gelmann et al., supra) It is likely that mutated or altered expression of specific genes is involved in the pathogenesis of some leukemias, among other tissues and cell types. (Gelmann et al., supra) Indeed, the human counterparts of the oncogenes involved in some animal neoplasias have been amplified or translocated in some cases of human leukemia and carcinoma. (Gelmann et al., supra)

For example, c-myc expression is highly amplified in the non-lymphocytic leukemia cell line HL-60. When HL-60 cells are chemically induced to stop proliferation, the level of c-myc is found to be downregulated. (International Publication Number WO 91/15580). However, it has been shown that exposure of HL-60 cells to a DNA construct that is complementary to the 5' end of c-myc or c-myb blocks translation of the corresponding mRNAs which downregulates expression of the c-myc or c-myb proteins and causes arrest of cell proliferation and differentiation of the treated cells. (International Publication Number WO 91/15580; Wickstrom et al., Proc. Natl. Acad. Sci. 85:1028 (1988); Anfossi et al., Proc. Natl. Acad. Sci. 86:3379 (1989)). However, the skilled artisan would appreciate the present invention's usefulness is not limited to treatment of proliferative disorders of hematopoietic cells and tissues, in light of the numerous cells and cell types of varying origins which are known to exhibit proliferative phenotypes.

In addition to the foregoing, a colon cancer antigen polynucleotide can be used to control gene expression through triple helix formation or through antisense DNA or RNA. Antisense techniques are discussed, for example, in Okano, J. Neurochem. 56: 560 (1991); "Oligodeoxynucleotides as Antisense Inhibitors of Gene Expression, CRC Press, Boca Raton, FL (1988). Triple helix formation is discussed in, for instance Lee et al., Nucleic Acids Research 6: 3073 (1979); Cooney et al., Science 241: 456 (1988); and Dervan et al., Science 251: 1360 (1991). Both methods rely on binding of the polynucleotide to a complementary DNA or RNA. For these techniques, preferred polynucleotides are usually oligonucleotides 20 to 40 bases in length and complementary to either the region of the gene involved in transcription (triple helix - see Lee et al., Nucl. Acids Res. 6:3073 (1979); Cooney et al., Science 241:456 (1988); and Dervan et al., Science 251:1360 (1991)) or to the mRNA itself (antisense - Okano, J. Neurochem. 56:560 (1991); Oligodeoxy-nucleotides as Antisense

Inhibitors of Gene Expression, CRC Press, Boca Raton. FL (1988).) Triple helix formation optimally results in a shut-off of RNA transcription from DNA, while antisense RNA hybridization blocks translation of an mRNA molecule into polypeptide. The oligonucleotide described above can also be delivered to cells such that the antisense RNA or DNA may be expressed in vivo to inhibit production of polypeptide of the present invention antigens. Both techniques are effective in model systems. and the information disclosed herein can be used to design antisense or triple helix polynucleotides in an effort to treat disease, and in particular. for the treatment of proliferative diseases and/or conditions.

Polynucleotides of the present invention are also useful in gene therapy. One goal of gene therapy is to insert a normal gene into an organism having a defective gene, in an effort to correct the genetic defect. The polynucleotides disclosed in the present invention offer a means of targeting such genetic defects in a highly accurate manner. Another goal is to insert a new gene that was not present in the host genome, thereby producing a new trait in the host cell.

The polynucleotides are also useful for identifying individuals from minute biological samples. The United States military, for example, is considering the use of restriction fragment length polymorphism (RFLP) for identification of its personnel. In this technique, an individual's genomic DNA is digested with one or more restriction enzymes, and probed on a Southern blot to yield unique bands for identifying personnel. This method does not suffer from the current limitations of "Dog Tags" which can be lost, switched, or stolen, making positive identification difficult. The polynucleotides of the present invention can be used as additional DNA markers for RFLP.

The polynucleotides of the present invention can also be used as an alternative to RFLP, by determining the actual base-by-base DNA sequence of selected portions of an individual's genome. These sequences can be used to prepare PCR primers for amplifying and isolating such selected DNA, which can then be sequenced. Using this technique, individuals can be identified because each individual will have a unique set of DNA sequences. Once an unique ID database is established for an individual, positive identification of that individual, living or dead, can be made from extremely small tissue samples.

Forensic biology also benefits from using DNA-based identification techniques as disclosed herein. DNA sequences taken from very small biological samples such as tissues,

e.g., hair or skin, or body fluids, e.g., blood, saliva, semen, synovial fluid, amniotic fluid, breast milk, lymph, pulmonary sputum or surfactant, urine, fecal matter, etc., can be amplified using PCR. In one prior art technique, gene sequences amplified from polymorphic loci, such as DQa class II HLA gene, are used in forensic biology to identify individuals. (Erlich, H., PCR Technology, Freeman and Co. (1992).) Once these specific polymorphic loci are amplified, they are digested with one or more restriction enzymes, yielding an identifying set of bands on a Southern blot probed with DNA corresponding to the DQa class II HLA gene. Similarly, polynucleotides of the present invention can be used as polymorphic markers for forensic purposes.

There is also a need for reagents capable of identifying the source of a particular tissue. Such need arises, for example, in forensics when presented with tissue of unknown origin. Appropriate reagents can comprise, for example, DNA probes or primers specific to colon or colon cancer polynucleotides prepared from the sequences of the present invention. Panels of such reagents can identify tissue by species and/or by organ type. In a similar fashion, these reagents can be used to screen tissue cultures for contamination.

The polynucleotides of the present invention are also useful as hybridization probes for differential identification of the tissue(s) or cell type(s) present in a biological sample. Similarly, polypeptides and antibodies directed to polypeptides of the present invention are useful to provide immunological probes for differential identification of the tissue(s) (e.g., immunohistochemistry assays) or cell type(s) (e.g., immunocytochemistry assays). In addition, for a number of disorders of the above tissues or cells, significantly higher or lower levels of gene expression of the polynucleotides/polypeptides of the present invention may be detected in certain tissues (e.g., tissues expressing polypeptides and/or polynucleotides of the present invention, colon and colon cancer tissues and/or cancerous and/or wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) taken from an individual having such a disorder, relative to a "standard" gene expression level, i.e., the expression level in healthy tissue from an individual not having the disorder.

Thus, the invention provides a diagnostic method of a disorder, which involves: (a) assaying gene expression level in cells or body fluid of an individual; (b) comparing the gene expression level with a standard gene expression level, whereby an increase or decrease in the assayed gene expression level compared to the standard expression level is indicative of a disorder.

In the very least. the polynucleotides of the present invention can be used as molecular weight markers on Southern gels, as diagnostic probes for the presence of a specific mRNA in a particular cell type, as a probe to "subtract-out" known sequences in the process of discovering novel polynucleotides, for selecting and making oligomers for attachment to a "gene chip" or other support. to raise anti-DNA antibodies using DNA immunization techniques. and as an antigen to elicit an immune response.

Uses of the Polypeptides

Each of the polypeptides identified herein can be used in numerous ways. The following description should be considered exemplary and utilizes known techniques.

Polypeptides and antibodies directed to polypeptides of the present invention are useful to provide immunological probes for differential identification of the tissue(s) (e.g., immunohistochemistry assays such as, for example, ABC immunoperoxidase (Hsu et al., J. Histochem. Cytochem. 29:577-580 (1981)) or cell type(s) (e.g., immunocytochemistry assays).

Antibodies can be used to assay levels of polypeptides encoded by polynucleotides of the invention in a biological sample using classical immunohistological methods known to those of skill in the art (e.g., see Jalkanen, et al., J. Cell. Biol. 101:976-985 (1985); Jalkanen, et al., J. Cell. Biol. 105:3087-3096 (1987)). Other antibody-based methods useful for detecting protein gene expression include immunoassays, such as the enzyme linked immunosorbent assay (ELISA) and the radioimmunoassay (RIA). Suitable antibody assay labels are known in the art and include enzyme labels, such as, glucose oxidase; radioisotopes, such as iodine (^{131}I, ^{125}I, ^{123}I, ^{121}I), carbon (^{14}C), sulfur (^{35}S), tritium (^{3}H), indium (^{115m}In, ^{113m}In, ^{112}In, ^{111}In), and technetium (^{99}Tc, ^{99m}Tc), thallium (^{201}Ti), gallium (^{68}Ga, ^{67}Ga), palladium (^{103}Pd), molybdenum (^{99}Mo), xenon (^{133}Xe), fluorine (^{18}F), ^{153}Sm, ^{177}Lu, ^{159}Gd, ^{149}Pm, ^{140}La, ^{175}Yb, ^{166}Ho, ^{90}Y, ^{47}Sc, ^{186}Re, ^{188}Re, ^{142}Pr, ^{105}Rh, ^{97}Ru; luminescent labels, such as luminol; and fluorescent labels, such as fluorescein and rhodamine, and biotin.

In addition to assaying levels of polypeptide of the present invention in a biological sample, proteins can also be detected in vivo by imaging. Antibody labels or markers for in vivo imaging of protein include those detectable by X-radiography, NMR or ESR. For X-radiography, suitable labels include radioisotopes such as barium or cesium, which emit

detectable radiation but are not overtly harmful to the subject. Suitable markers for NMR and ESR include those with a detectable characteristic spin, such as deuterium, which may be incorporated into the antibody by labeling of nutrients for the relevant hybridoma.

A protein-specific antibody or antibody fragment which has been labeled with an appropriate detectable imaging moiety, such as a radioisotope (for example, ^{131}I, ^{112}In, ^{99m}Tc, (^{131}I, ^{125}I, ^{123}I, ^{121}I), carbon (^{14}C), sulfur (^{35}S), tritium (^{3}H), indium (^{115m}In, ^{113m}In, ^{112}In, ^{111}In), and technetium (^{99}Tc, ^{99m}Tc), thallium (^{201}Ti), gallium (^{68}Ga, ^{67}Ga), palladium (^{103}Pd), molybdenum (^{99}Mo), xenon (^{133}Xe), fluorine (^{18}F, ^{153}Sm, ^{177}Lu, ^{159}Gd, ^{149}Pm, ^{140}La, ^{175}Yb, ^{166}Ho, ^{90}Y, ^{47}Sc, ^{186}Re, ^{188}Re, ^{142}Pr, ^{105}Rh, ^{97}Ru), a radio-opaque substance, or a material detectable by nuclear magnetic resonance, is introduced (for example, parenterally, subcutaneously or intraperitoneally) into the mammal to be examined for immune system disorder. It will be understood in the art that the size of the subject and the imaging system used will determine the quantity of imaging moiety needed to produce diagnostic images. In the case of a radioisotope moiety, for a human subject, the quantity of radioactivity injected will normally range from about 5 to 20 millicuries of ^{99m}Tc. The labeled antibody or antibody fragment will then preferentially accumulate at the location of cells which express the polypeptide encoded by a polynucleotide of the invention. *In vivo* tumor imaging is described in S.W. Burchiel et al., "Immunopharmacokinetics of Radiolabeled Antibodies and Their Fragments" (Chapter 13 in *Tumor Imaging: The Radiochemical Detection of Cancer*, S.W. Burchiel and B. A. Rhodes, eds., Masson Publishing Inc. (1982)).

In one embodiment, the invention provides a method for the specific delivery of compositions of the invention to cells by administering polypeptides of the invention (e.g., polypeptides encoded by polynucleotides of the invention and/or antibodies) that are associated with heterologous polypeptides or nucleic acids. In one example, the invention provides a method for delivering a therapeutic protein into the targeted cell. In another example, the invention provides a method for delivering a single stranded nucleic acid (e.g., antisense or ribozymes) or double stranded nucleic acid (e.g., DNA that can integrate into the cell's genome or replicate episomally and that can be transcribed) into the targeted cell.

In another embodiment, the invention provides a method for the specific destruction of cells (e.g., the destruction of tumor cells) by administering polypeptides of the invention in association with toxins or cytotoxic prodrugs.

By "toxin" is meant one or more compounds that bind and activate endogenous cytotoxic effector systems, radioisotopes, holotoxins, modified toxins, catalytic subunits of toxins, or any molecules or enzymes not normally present in or on the surface of a cell that under defined conditions cause the cell's death. Toxins that may be used according to the methods of the invention include, but are not limited to, radioisotopes known in the art, compounds such as, for example, antibodies (or complement fixing containing portions thereof) that bind an inherent or induced endogenous cytotoxic effector system, thymidine kinase, endonuclease, RNAse, alpha toxin, ricin, abrin, *Pseudomonas* exotoxin A, diphtheria toxin, saporin, momordin, gelonin, pokeweed antiviral protein, alpha-sarcin and cholera toxin. "Toxin" also includes a cytostatic or cytocidal agent, a therapeutic agent or a radioactive metal ion, e.g., alpha-emitters such as, for example, ^{213}Bi, or other radioisotopes such as, for example, ^{103}Pd, ^{133}Xe, ^{131}I, ^{68}Ge, ^{57}Co, ^{65}Zn, ^{85}Sr, ^{32}P, ^{35}S, ^{90}Y, ^{153}Sm, ^{153}Gd, ^{169}Yb, ^{51}Cr, ^{54}Mn, ^{75}Se, ^{113}Sn, ^{90}Yttrium, ^{117}Tin, ^{186}Rhenium, ^{166}Holmium, and ^{188}Rhenium; luminescent labels, such as luminol; and fluorescent labels, such as fluorescein and rhodamine, and biotin.

Techniques known in the art may be applied to label polypeptides of the invention (including antibodies). Such techniques include, but are not limited to, the use of bifunctional conjugating agents (see e.g., U.S. Patent Nos. 5,756,065; 5,714,631; 5,696,239; 5,652,361; 5,505,931; 5,489,425; 5,435,990; 5,428,139; 5,342,604; 5,274,119; 4,994,560; and 5,808,003; the contents of each of which are hereby incorporated by reference in its entirety).

Thus, the invention provides a diagnostic method of a disorder, which involves (a) assaying the expression level of a colon cancer polypeptide of the present invention in cells or body fluid of an individual, or more preferrably, assaying the expression level of a colon cancer polypeptide of the present invention in colon cells or sera of an individual; and (b) comparing the assayed polypeptide expression level with a standard polypeptide expression level, whereby an increase or decrease in the assayed polypeptide expression level compared to the standard expression level is indicative of a disorder. With respect to cancer, the presence of a relatively high amount of transcript in biopsied tissue from an individual may indicate a predisposition for the development of the disease, or may provide a means for detecting the disease prior to the appearance of actual clinical symptoms. A more definitive diagnosis of this type may allow health professionals to employ preventative measures or

aggressive treatment earlier thereby preventing the development or further progression of the cancer.

Moreover. colon cancer antigen polypeptides of the present invention can be used to treat or prevent diseases or conditions such as, for example, neural disorders, immune system disorders, muscular disorders, reproductive disorders, gastrointestinal disorders, pulmonary disorders. cardiovascular disorders, renal disorders, proliferative disorders. and/or cancerous diseases and conditions, preferably proliferative disorders of the colon, and/or cancerous disease and conditions. For example, patients can be administered a polypeptide of the present invention in an effort to replace absent or decreased levels of the polypeptide (e.g., insulin), to supplement absent or decreased levels of a different polypeptide (e.g., hemoglobin S for hemoglobin B. SOD, catalase, DNA repair proteins), to inhibit the activity of a polypeptide (e.g., an oncogene or tumor supressor), to activate the activity of a polypeptide (e.g., by binding to a receptor), to reduce the activity of a membrane bound receptor by competing with it for free ligand (e.g., soluble TNF receptors used in reducing inflammation), or to bring about a desired response (e.g., blood vessel growth inhibition, enhancement of the immune response to proliferative cells or tissues).

Similarly, antibodies directed to a polypeptide of the present invention can also be used to treat disease (as described supra, and elsewhere herein). For example, administration of an antibody directed to a polypeptide of the present invention can bind, and/or neutralize the polypeptide. and/or reduce overproduction of the polypeptide. Similarly, administration of an antibody can activate the polypeptide, such as by binding to a polypeptide bound to a membrane (receptor).

At the very least, the polypeptides of the present invention can be used as molecular weight markers on SDS-PAGE gels or on molecular sieve gel filtration columns using methods well known to those of skill in the art. Polypeptides can also be used to raise antibodies, which in turn are used to measure protein expression from a recombinant cell, as a way of assessing transformation of the host cell. Moreover, the polypeptides of the present invention can be used to test the following biological activities.

Gene Therapy Methods

Another aspect of the present invention is to gene therapy methods for treating or preventing disorders, diseases and conditions. The gene therapy methods relate to the introduction of nucleic acid (DNA, RNA and antisense DNA or RNA) sequences into an animal to achieve expression of the polypeptide of the present invention. This method requires a polynucleotide which codes for a polypeptide of the present invention operatively linked to a promoter and any other genetic elements necessary for the expression of the polypeptide by the target tissue. Such gene therapy and delivery techniques are known in the art, see, for example, WO90/11092, which is herein incorporated by reference.

Thus, for example, cells from a patient may be engineered with a polynucleotide (DNA or RNA) comprising a promoter operably linked to a polynucleotide of the present invention ex vivo, with the engineered cells then being provided to a patient to be treated with the polypeptide of the present invention. Such methods are well-known in the art. For example, see Belldegrun, A., et al., J. Natl. Cancer Inst. 85: 207-216 (1993); Ferrantini, M. et al., Cancer Research 53: 1107-1112 (1993); Ferrantini, M. et al., J. Immunology 153: 4604-4615 (1994); Kaido, T., et al., Int. J. Cancer 60: 221-229 (1995); Ogura, H., et al., Cancer Research 50: 5102-5106 (1990); Santodonato, L., et al., Human Gene Therapy 7:1-10 (1996); Santodonato, L., et al., Gene Therapy 4:1246-1255 (1997); and Zhang, J.-F. et al., Cancer Gene Therapy 3: 31-38 (1996)), which are herein incorporated by reference. In one embodiment, the cells which are engineered are arterial cells. The arterial cells may be reintroduced into the patient through direct injection to the artery, the tissues surrounding the artery, or through catheter injection.

As discussed in more detail below, the polynucleotide constructs can be delivered by any method that delivers injectable materials to the cells of an animal, such as, injection into the interstitial space of tissues (heart, muscle, skin, lung, liver, and the like). The polynucleotide constructs may be delivered in a pharmaceutically acceptable liquid or aqueous carrier.

In one embodiment, the polynucleotide of the present invention is delivered as a naked polynucleotide. The term "naked" polynucleotide, DNA or RNA refers to sequences that are free from any delivery vehicle that acts to assist, promote or facilitate entry into the cell, including viral sequences, viral particles, liposome formulations, lipofectin or precipitating agents and the like. However, the polynucleotide of the present invention can

also be delivered in liposome formulations and lipofectin formulations and the like can be prepared by methods well known to those skilled in the art. Such methods are described, for example, in U.S. Patent Nos. 5,593.972, 5,589,466, and 5,580,859, which are herein incorporated by reference.

The polynucleotide vector constructs used in the gene therapy method are preferably constructs that will not integrate into the host genome nor will they contain sequences that allow for replication. Appropriate vectors include pWLNEO, pSV2CAT, pOG44, pXT1 and pSG available from Stratagene; pSVK3, pBPV, pMSG and pSVL available from Pharmacia; and pEF1/V5, pcDNA3.1, and pRc/CMV2 available from Invitrogen. Other suitable vectors will be readily apparent to the skilled artisan.

Any strong promoter known to those skilled in the art can be used for driving the expression of the polynucleotide sequence. Suitable promoters include adenoviral promoters, such as the adenoviral major late promoter; or heterologous promoters, such as the cytomegalovirus (CMV) promoter; the respiratory syncytial virus (RSV) promoter; inducible promoters, such as the MMT promoter, the metallothionein promoter; heat shock promoters; the albumin promoter; the ApoAI promoter; human globin promoters; viral thymidine kinase promoters, such as the Herpes Simplex thymidine kinase promoter; retroviral LTRs; the b-actin promoter; and human growth hormone promoters. The promoter also may be the native promoter for the polynucleotide of the present invention.

Unlike other gene therapy techniques, one major advantage of introducing naked nucleic acid sequences into target cells is the transitory nature of the polynucleotide synthesis in the cells. Studies have shown that non-replicating DNA sequences can be introduced into cells to provide production of the desired polypeptide for periods of up to six months.

The polynucleotide construct can be delivered to the interstitial space of tissues within the an animal, including of muscle, skin, brain, lung, liver, spleen, bone marrow, thymus, heart, lymph, blood, bone, cartilage, pancreas, kidney, gall bladder, stomach, intestine, testis, ovary, uterus, rectum, nervous system, eye, gland, and connective tissue. Interstitial space of the tissues comprises the intercellular, fluid, mucopolysaccharide matrix among the reticular fibers of organ tissues, elastic fibers in the walls of vessels or chambers, collagen fibers of fibrous tissues, or that same matrix within connective tissue ensheathing muscle cells or in the lacunae of bone. It is similarly the space occupied by the plasma of the circulation and the lymph fluid of the lymphatic channels. Delivery to the interstitial space of muscle tissue is

preferred for the reasons discussed below. They may be conveniently delivered by injection into the tissues comprising these cells. They are preferably delivered to and expressed in persistent. non-dividing cells which are differentiated, although delivery and expression may be achieved in non-differentiated or less completely differentiated cells, such as, for example, stem cells of blood or skin fibroblasts. In vivo muscle cells are particularly competent in their ability to take up and express polynucleotides.

For the naked nucleic acid sequence injection, an effective dosage amount of DNA or RNA will be in the range of from about 0.05 mg/kg body weight to about 50 mg/kg body weight. Preferably the dosage will be from about 0.005 mg/kg to about 20 mg/kg and more preferably from about 0.05 mg/kg to about 5 mg/kg. Of course, as the artisan of ordinary skill will appreciate, this dosage will vary according to the tissue site of injection. The appropriate and effective dosage of nucleic acid sequence can readily be determined by those of ordinary skill in the art and may depend on the condition being treated and the route of administration.

The preferred route of administration is by the parenteral route of injection into the interstitial space of tissues. However, other parenteral routes may also be used, such as, inhalation of an aerosol formulation particularly for delivery to lungs or bronchial tissues, throat or mucous membranes of the nose. In addition, naked DNA constructs can be delivered to arteries during angioplasty by the catheter used in the procedure.

The naked polynucleotides are delivered by any method known in the art, including, but not limited to, direct needle injection at the delivery site, intravenous injection, topical administration, catheter infusion, and so-called "gene guns". These delivery methods are known in the art.

The constructs may also be delivered with delivery vehicles such as viral sequences, viral particles, liposome formulations, lipofectin, precipitating agents, etc. Such methods of delivery are known in the art.

In certain embodiments, the polynucleotide constructs are complexed in a liposome preparation. Liposomal preparations for use in the instant invention include cationic (positively charged), anionic (negatively charged) and neutral preparations. However, cationic liposomes are particularly preferred because a tight charge complex can be formed between the cationic liposome and the polyanionic nucleic acid. Cationic liposomes have been shown to mediate intracellular delivery of plasmid DNA (Felgner et al., Proc. Natl. Acad. Sci. USA (1987) 84:7413-7416, which is herein incorporated by reference); mRNA

(Malone et al., Proc. Natl. Acad. Sci. USA (1989) 86:6077-6081, which is herein incorporated by reference); and purified transcription factors (Debs et al., J. Biol. Chem. (1990) 265:10189-10192, which is herein incorporated by reference), in functional form.

Cationic liposomes are readily available. For example, N[1-2,3-dioleyloxy)propyl]-N,N,N-triethylammonium (DOTMA) liposomes are particularly useful and are available under the trademark Lipofectin, from GIBCO BRL, Grand Island, N.Y. (See, also, Felgner et al., Proc. Natl Acad. Sci. USA (1987) 84:7413-7416, which is herein incorporated by reference). Other commercially available liposomes include transfectace (DDAB/DOPE) and DOTAP/DOPE (Boehringer).

Other cationic liposomes can be prepared from readily available materials using techniques well known in the art. See, e.g. PCT Publication No. WO 90/11092 (which is herein incorporated by reference) for a description of the synthesis of DOTAP (1,2-bis(oleoyloxy)-3-(trimethylammonio)propane) liposomes. Preparation of DOTMA liposomes is explained in the literature, see, e.g., P. Felgner et al., Proc. Natl. Acad. Sci. USA 84:7413-7417, which is herein incorporated by reference. Similar methods can be used to prepare liposomes from other cationic lipid materials.

Similarly, anionic and neutral liposomes are readily available, such as from Avanti Polar Lipids (Birmingham, Ala.), or can be easily prepared using readily available materials. Such materials include phosphatidyl, choline, cholesterol, phosphatidyl ethanolamine, dioleoylphosphatidyl choline (DOPC), dioleoylphosphatidyl glycerol (DOPG), dioleoylphoshatidyl ethanolamine (DOPE), among others. These materials can also be mixed with the DOTMA and DOTAP starting materials in appropriate ratios. Methods for making liposomes using these materials are well known in the art.

For example, commercially dioleoylphosphatidyl choline (DOPC), dioleoylphosphatidyl glycerol (DOPG), and dioleoylphosphatidyl ethanolamine (DOPE) can be used in various combinations to make conventional liposomes, with or without the addition of cholesterol. Thus, for example, DOPG/DOPC vesicles can be prepared by drying 50 mg each of DOPG and DOPC under a stream of nitrogen gas into a sonication vial. The sample is placed under a vacuum pump overnight and is hydrated the following day with deionized water. The sample is then sonicated for 2 hours in a capped vial, using a Heat Systems model 350 sonicator equipped with an inverted cup (bath type) probe at the maximum setting while the bath is circulated at 15EC. Alternatively, negatively charged

vesicles can be prepared without sonication to produce multilamellar vesicles or by extrusion through nucleopore membranes to produce unilamellar vesicles of discrete size. Other methods are known and available to those of skill in the art.

The liposomes can comprise multilamellar vesicles (MLVs), small unilamellar vesicles (SUVs), or large unilamellar vesicles (LUVs), with SUVs being preferred. The various liposome-nucleic acid complexes are prepared using methods well known in the art. See, e.g., Straubinger et al., Methods of Immunology (1983), 101:512-527, which is herein incorporated by reference. For example, MLVs containing nucleic acid can be prepared by depositing a thin film of phospholipid on the walls of a glass tube and subsequently hydrating with a solution of the material to be encapsulated. SUVs are prepared by extended sonication of MLVs to produce a homogeneous population of unilamellar liposomes. The material to be entrapped is added to a suspension of preformed MLVs and then sonicated. When using liposomes containing cationic lipids, the dried lipid film is resuspended in an appropriate solution such as sterile water or an isotonic buffer solution such as 10 mM Tris/NaCl, sonicated, and then the preformed liposomes are mixed directly with the DNA. The liposome and DNA form a very stable complex due to binding of the positively charged liposomes to the cationic DNA. SUVs find use with small nucleic acid fragments. LUVs are prepared by a number of methods, well known in the art. Commonly used methods include Ca^{2+}-EDTA chelation (Papahadjopoulos et al., Biochim. Biophys. Acta (1975) 394:483; Wilson et al., Cell (1979) 17:77); ether injection (Deamer, D. and Bangham, A., Biochim. Biophys. Acta (1976) 443:629; Ostro et al., Biochem. Biophys. Res. Commun. (1977) 76:836; Fraley et al., Proc. Natl. Acad. Sci. USA (1979) 76:3348); detergent dialysis (Enoch, H. and Strittmatter, P., Proc. Natl. Acad. Sci. USA (1979) 76:145); and reverse-phase evaporation (REV) (Fraley et al., J. Biol. Chem. (1980) 255:10431; Szoka, F. and Papahadjopoulos, D., Proc. Natl. Acad. Sci. USA (1978) 75:145; Schaefer-Ridder et al., Science (1982) 215:166), which are herein incorporated by reference.

Generally, the ratio of DNA to liposomes will be from about 10:1 to about 1:10. Preferably, the ration will be from about 5:1 to about 1:5. More preferably, the ration will be about 3:1 to about 1:3. Still more preferably, the ratio will be about 1:1.

U.S. Patent No. 5,676,954 (which is herein incorporated by reference) reports on the injection of genetic material, complexed with cationic liposomes carriers, into mice. U.S. Patent Nos. 4,897,355, 4,946,787, 5,049,386, 5,459,127, 5,589,466, 5,693,622, 5,580,859,

5,703,055, and international publication no. WO 94/9469 (which are herein incorporated by reference) provide cationic lipids for use in transfecting DNA into cells and mammals. U.S. Patent Nos. 5,589,466, 5,693,622, 5,580,859, 5,703,055, and international publication no. WO 94/9469 (which are herein incorporated by reference) provide methods for delivering DNA-cationic lipid complexes to mammals.

In certain embodiments, cells are engineered, ex vivo or in vivo, using a retroviral particle containing RNA which comprises a sequence encoding a polypeptide of the present invention. Retroviruses from which the retroviral plasmid vectors may be derived include, but are not limited to, Moloney Murine Leukemia Virus, spleen necrosis virus, Rous sarcoma Virus, Harvey Sarcoma Virus, avian leukosis virus, gibbon ape leukemia virus, human immunodeficiency virus, Myeloproliferative Sarcoma Virus, and mammary tumor virus.

The retroviral plasmid vector is employed to transduce packaging cell lines to form producer cell lines. Examples of packaging cells which may be transfected include, but are not limited to, the PE501, PA317, R-2, R-AM, PA12, T19-14X, VT-19-17-H2, RCRE, RCRIP, GP+E-86, GP+envAm12, and DAN cell lines as described in Miller, Human Gene Therapy 1:5-14 (1990), which is incorporated herein by reference in its entirety. The vector may transduce the packaging cells through any means known in the art. Such means include, but are not limited to, electroporation, the use of liposomes, and $CaPO_4$ precipitation. In one alternative, the retroviral plasmid vector may be encapsulated into a liposome, or coupled to a lipid, and then administered to a host.

The producer cell line generates infectious retroviral vector particles which include polynucleotide encoding a polypeptide of the present invention. Such retroviral vector particles then may be employed, to transduce eukaryotic cells, either in vitro or in vivo. The transduced eukaryotic cells will express a polypeptide of the present invention.

In certain other embodiments, cells are engineered, ex vivo or in vivo, with polynucleotide contained in an adenovirus vector. Adenovirus can be manipulated such that it encodes and expresses a polypeptide of the present invention, and at the same time is inactivated in terms of its ability to replicate in a normal lytic viral life cycle. Adenovirus expression is achieved without integration of the viral DNA into the host cell chromosome, thereby alleviating concerns about insertional mutagenesis. Furthermore, adenoviruses have been used as live enteric vaccines for many years with an excellent safety profile (Schwartz, A. R. et al. (1974) Am. Rev. Respir. Dis.109:233-238). Finally, adenovirus mediated gene

transfer has been demonstrated in a number of instances including transfer of alpha-1-antitrypsin and CFTR to the lungs of cotton rats (Rosenfeld, M. A. et al. (1991) Science 252:431-434; Rosenfeld et al., (1992) Cell 68:143-155). Furthermore, extensive studies to attempt to establish adenovirus as a causative agent in human cancer were uniformly negative (Green, M. et al. (1979) Proc. Natl. Acad. Sci. USA 76:6606).

Suitable adenoviral vectors useful in the present invention are described, for example, in Kozarsky and Wilson, Curr. Opin. Genet. Devel. 3:499-503 (1993); Rosenfeld et al., Cell 68:143-155 (1992); Engelhardt et al., Human Genet. Ther. 4:759-769 (1993); Yang et al., Nature Genet. 7:362-369 (1994); Wilson et al., Nature 365:691-692 (1993); and U.S. Patent No. 5,652,224, which are herein incorporated by reference. For example, the adenovirus vector Ad2 is useful and can be grown in human 293 cells. These cells contain the E1 region of adenovirus and constitutively express Ela and Elb, which complement the defective adenoviruses by providing the products of the genes deleted from the vector. In addition to Ad2, other varieties of adenovirus (e.g., Ad3, Ad5, and Ad7) are also useful in the present invention.

Preferably, the adenoviruses used in the present invention are replication deficient. Replication deficient adenoviruses require the aid of a helper virus and/or packaging cell line to form infectious particles. The resulting virus is capable of infecting cells and can express a polynucleotide of interest which is operably linked to a promoter, but cannot replicate in most cells. Replication deficient adenoviruses may be deleted in one or more of all or a portion of the following genes: E1a, E1b, E3, E4, E2a, or L1 through L5.

In certain other embodiments, the cells are engineered, ex vivo or in vivo, using an adeno-associated virus (AAV). AAVs are naturally occurring defective viruses that require helper viruses to produce infectious particles (Muzyczka, N., Curr. Topics in Microbiol. Immunol. 158:97 (1992)). It is also one of the few viruses that may integrate its DNA into non-dividing cells. Vectors containing as little as 300 base pairs of AAV can be packaged and can integrate, but space for exogenous DNA is limited to about 4.5 kb. Methods for producing and using such AAVs are known in the art. See, for example, U.S. Patent Nos. 5,139,941, 5,173,414, 5,354,678, 5,436,146, 5,474,935, 5,478,745, and 5,589,377.

For example, an appropriate AAV vector for use in the present invention will include all the sequences necessary for DNA replication, encapsidation, and host-cell integration. The polynucleotide construct is inserted into the AAV vector using standard cloning

methods, such as those found in Sambrook et al., Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Press (1989). The recombinant AAV vector is then transfected into packaging cells which are infected with a helper virus, using any standard technique, including lipofection, electroporation, calcium phosphate precipitation, etc. Appropriate helper viruses include adenoviruses, cytomegaloviruses, vaccinia viruses, or herpes viruses. Once the packaging cells are transfected and infected, they will produce infectious AAV viral particles which contain the polynucleotide construct. These viral particles are then used to transduce eukaryotic cells, either ex vivo or in vivo. The transduced cells will contain the polynucleotide construct integrated into its genome, and will express a polypeptide of the invention.

Another method of gene therapy involves operably associating heterologous control regions and endogenous polynucleotide sequences (e.g. encoding a polypeptide of the present invention) via homologous recombination (see, e.g., U.S. Patent No. 5,641,670, issued June 24, 1997; International Publication No. WO 96/29411, published September 26, 1996; International Publication No. WO 94/12650, published August 4, 1994; Koller et al., Proc. Natl. Acad. Sci. USA 86:8932-8935 (1989); and Zijlstra et al., Nature 342:435-438 (1989). This method involves the activation of a gene which is present in the target cells, but which is not normally expressed in the cells, or is expressed at a lower level than desired.

Polynucleotide constructs are made, using standard techniques known in the art, which contain the promoter with targeting sequences flanking the promoter. Suitable promoters are described herein. The targeting sequence is sufficiently complementary to an endogenous sequence to permit homologous recombination of the promoter-targeting sequence with the endogenous sequence. The targeting sequence will be sufficiently near the 5' end of the desired endogenous polynucleotide sequence so the promoter will be operably linked to the endogenous sequence upon homologous recombination.

The promoter and the targeting sequences can be amplified using PCR. Preferably, the amplified promoter contains distinct restriction enzyme sites on the 5' and 3' ends. Preferably, the 3' end of the first targeting sequence contains the same restriction enzyme site as the 5' end of the amplified promoter and the 5' end of the second targeting sequence contains the same restriction site as the 3' end of the amplified promoter. The amplified promoter and targeting sequences are digested and ligated together.

The promoter-targeting sequence construct is delivered to the cells, either as naked polynucleotide, or in conjunction with transfection-facilitating agents. such as liposomes, viral sequences, viral particles, whole viruses, lipofection, precipitating agents. etc., described in more detail above. The P promoter-targeting sequence can be delivered by any method, included direct needle injection, intravenous injection, topical administration, catheter infusion, particle accelerators, etc. The methods are described in more detail below.

The promoter-targeting sequence construct is taken up by cells. Homologous recombination between the construct and the endogenous sequence takes place, such that an endogenous sequence is placed under the control of the promoter. The promoter then drives the expression of the endogenous sequence.

Preferably, the polynucleotide encoding a polypeptide of the present invention contains a secretory signal sequence that facilitates secretion of the protein. Typically, the signal sequence is positioned in the coding region of the polynucleotide to be expressed towards or at the 5' end of the coding region. The signal sequence may be homologous or heterologous to the polynucleotide of interest and may be homologous or heterologous to the cells to be transfected. Additionally, the signal sequence may be chemically synthesized using methods known in the art.

Any mode of administration of any of the above-described polynucleotides constructs can be used so long as the mode results in the expression of one or more molecules in an amount sufficient to provide a therapeutic effect. This includes direct needle injection, systemic injection, catheter infusion, biolistic injectors, particle accelerators (i.e., "gene guns"), gelfoam sponge depots, other commercially available depot materials, osmotic pumps (e.g., Alza minipumps), oral or suppositorial solid (tablet or pill) pharmaceutical formulations, and decanting or topical applications during surgery. For example, direct injection of naked calcium phosphate-precipitated plasmid into rat liver and rat spleen or a protein-coated plasmid into the portal vein has resulted in gene expression of the foreign gene in the rat livers (Kaneda et al., Science 243:375 (1989)).

A preferred method of local administration is by direct injection. Preferably, a recombinant molecule of the present invention complexed with a delivery vehicle is administered by direct injection into or locally within the area of arteries. Administration of a composition locally within the area of arteries refers to injecting the composition centimeters and preferably, millimeters within arteries.

Another method of local administration is to contact a polynucleotide construct of the present invention in or around a surgical wound. For example, a patient can undergo surgery and the polynucleotide construct can be coated on the surface of tissue inside the wound or the construct can be injected into areas of tissue inside the wound.

Therapeutic compositions useful in systemic administration, include recombinant molecules of the present invention complexed to a targeted delivery vehicle of the present invention. Suitable delivery vehicles for use with systemic administration comprise liposomes comprising ligands for targeting the vehicle to a particular site.

Preferred methods of systemic administration, include intravenous injection. aerosol, oral and percutaneous (topical) delivery. Intravenous injections can be performed using methods standard in the art. Aerosol delivery can also be performed using methods standard in the art (see. for example, Stribling et al., Proc. Natl. Acad. Sci. USA 189:11277-11281, 1992, which is incorporated herein by reference). Oral delivery can be performed by complexing a polynucleotide construct of the present invention to a carrier capable of withstanding degradation by digestive enzymes in the gut of an animal. Examples of such carriers, include plastic capsules or tablets, such as those known in the art. Topical delivery can be performed by mixing a polynucleotide construct of the present invention with a lipophilic reagent (e.g., DMSO) that is capable of passing into the skin.

Determining an effective amount of substance to be delivered can depend upon a number of factors including, for example, the chemical structure and biological activity of the substance, the age and weight of the animal, the precise condition requiring treatment and its severity, and the route of administration. The frequency of treatments depends upon a number of factors, such as the amount of polynucleotide constructs administered per dose, as well as the health and history of the subject. The precise amount, number of doses, and timing of doses will be determined by the attending physician or veterinarian.

Therapeutic compositions of the present invention can be administered to any animal, preferably to mammals and birds. Preferred mammals include humans, dogs, cats, mice, rats, rabbits sheep, cattle, horses and pigs, with humans being particularly preferred.

__Biological Activities__

Polynucleotides or polypeptides, or agonists or antagonists of the present invention, can be used in assays to test for one or more biological activities. If these polynucleotides or

polypeptides. or agonists or antagonists of the present invention, do exhibit activity in a particular assay. it is likely that these molecules may be involved in the diseases associated with the biological activity. Thus. the polynucleotides and polypeptides. and agonists or antagonists could be used to treat the associated disease.

Immune Activity

A polypeptide or polynucleotide, or agonists or antagonists of the present invention may be useful in treating deficiencies or disorders of the immune system, by activating or inhibiting the proliferation, differentiation, or mobilization (chemotaxis) of immune cells. Immune cells develop through a process called hematopoiesis, producing myeloid (platelets, red blood cells. neutrophils, and macrophages) and lymphoid (B and T lymphocytes) cells from pluripotent stem cells. The etiology of these immune deficiencies or disorders may be genetic, somatic, such as cancer or some autoimmune disorders, acquired (e.g., by chemotherapy or toxins), or infectious. Moreover, polynucleotides or polypeptides, or agonists or antagonists of the present invention can be used as a marker or detector of a particular immune system disease or disorder.

Polynucleotides or polypeptides, or agonists or antagonists of the present invention may be useful in treating or detecting deficiencies or disorders of hematopoietic cells. Polynucleotides or polypeptides, or agonists or antagonists of the present invention could be used to increase differentiation and proliferation of hematopoietic cells, including the pluripotent stem cells, in an effort to treat those disorders associated with a decrease in certain (or many) types hematopoietic cells. Examples of immunologic deficiency syndromes include, but are not limited to: blood protein disorders (e.g. agammaglobulinemia, dysgammaglobulinemia), ataxia telangiectasia, common variable immunodeficiency, Digeorge Syndrome, HIV infection, HTLV-BLV infection, leukocyte adhesion deficiency syndrome, lymphopenia, phagocyte bactericidal dysfunction, severe combined immunodeficiency (SCIDs), Wiskott-Aldrich Disorder, anemia, thrombocytopenia, or hemoglobinuria.

Moreover, polynucleotides or polypeptides, or agonists or antagonists of the present invention could also be used to modulate hemostatic (the stopping of bleeding) or thrombolytic activity (clot formation). For example, by increasing hemostatic or thrombolytic activity, polynucleotides or polypeptides, or agonists or antagonists of the

present invention could be used to treat blood coagulation disorders (e.g.. afibrinogenemia, factor deficiencies), blood platelet disorders (e.g. thrombocytopenia), or wounds resulting from trauma, surgery, or other causes. Alternatively, polynucleotides or polypeptides, or agonists or antagonists of the present invention that can decrease hemostatic or thrombolytic activity could be used to inhibit or dissolve clotting. These molecules could be important in the treatment of heart attacks (infarction), strokes, or scarring.

Polynucleotides or polypeptides, or agonists or antagonists of the present invention may also be useful in treating or detecting autoimmune disorders. Many autoimmune disorders result from inappropriate recognition of self as foreign material by immune cells. This inappropriate recognition results in an immune response leading to the destruction of the host tissue. Therefore, the administration of polynucleotides or polypeptides, or agonists or antagonists of the present invention that can inhibit an immune response, particularly the proliferation, differentiation, or chemotaxis of T-cells, may be an effective therapy in preventing autoimmune disorders.

Examples of autoimmune disorders that can be treated or detected include, but are not limited to: Addison's Disease, hemolytic anemia, antiphospholipid syndrome, rheumatoid arthritis, dermatitis, allergic encephalomyelitis, glomerulonephritis, Goodpasture's Syndrome, Graves' Disease, Multiple Sclerosis, Myasthenia Gravis, Neuritis, Ophthalmia, Bullous Pemphigoid, Pemphigus, Polyendocrinopathies, Purpura, Reiter's Disease, Stiff-Man Syndrome, Autoimmune Thyroiditis, Systemic Lupus Erythematosus, Autoimmune Pulmonary Inflammation, Guillain-Barre Syndrome, insulin dependent diabetes mellitis, and autoimmune inflammatory eye disease.

Similarly, allergic reactions and conditions, such as asthma (particularly allergic asthma) or other respiratory problems, may also be treated by polynucleotides or polypeptides, or agonists or antagonists of the present invention. Moreover, these molecules can be used to treat anaphylaxis, hypersensitivity to an antigenic molecule, or blood group incompatibility.

Polynucleotides or polypeptides, or agonists or antagonists of the present invention may also be used to treat and/or prevent organ rejection or graft-versus-host disease (GVHD). Organ rejection occurs by host immune cell destruction of the transplanted tissue through an immune response. Similarly, an immune response is also involved in GVHD, but, in this case, the foreign transplanted immune cells destroy the host tissues. The administration of

polynucleotides or polypeptides, or agonists or antagonists of the present invention that inhibits an immune response, particularly the proliferation, differentiation, or chemotaxis of T-cells, may be an effective therapy in preventing organ rejection or GVHD.

Similarly, polynucleotides or polypeptides, or agonists or antagonists of the present invention may also be used to modulate inflammation. For example, polynucleotides or polypeptides, or agonists or antagonists of the present invention may inhibit the proliferation and differentiation of cells involved in an inflammatory response. These molecules can be used to treat inflammatory conditions, both chronic and acute conditions, including chronic prostatitis, granulomatous prostatitis and malacoplakia, inflammation associated with infection (e.g., septic shock, sepsis, or systemic inflammatory response syndrome (SIRS)), ischemia-reperfusion injury, endotoxin lethality, arthritis, complement-mediated hyperacute rejection, nephritis, cytokine or chemokine induced lung injury, inflammatory bowel disease, Crohn's disease, or resulting from over production of cytokines (e.g., TNF or IL-1.)

Hyperproliferative Disorders

Polynucleotides or polypeptides, or agonists or antagonists of the present invention can be used to treat or detect hyperproliferative disorders, including neoplasms. Polynucleotides or polypeptides, or agonists or antagonists of the present invention may inhibit the proliferation of the disorder through direct or indirect interactions. Alternatively, Polynucleotides or polypeptides, or agonists or antagonists of the present invention may proliferate other cells which can inhibit the hyperproliferative disorder.

For example, by increasing an immune response, particularly increasing antigenic qualities of the hyperproliferative disorder or by proliferating, differentiating, or mobilizing T-cells, hyperproliferative disorders can be treated. This immune response may be increased by either enhancing an existing immune response, or by initiating a new immune response. Alternatively, decreasing an immune response may also be a method of treating hyperproliferative disorders, such as a chemotherapeutic agent.

Examples of hyperproliferative disorders that can be treated or detected by Polynucleotides or polypeptides, or agonists or antagonists of the present invention include, but are not limited to neoplasms located in the: colon, abdomen, bone, breast, digestive system, liver, pancreas, peritoneum, endocrine glands (adrenal, parathyroid, pituitary,

testicles, ovary, thymus, thyroid), eye, head and neck, nervous (central and peripheral), lymphatic system, pelvic, skin, soft tissue, spleen, thoracic, and urogenital.

Similarly, other hyperproliferative disorders can also be treated or detected by polynucleotides or polypeptides, or agonists or antagonists of the present invention. Examples of such hyperproliferative disorders include, but are not limited to: hypergammaglobulinemia, lymphoproliferative disorders, paraproteinemias, purpura, sarcoidosis, Sezary Syndrome, Waldenstron's Macroglobulinemia, Gaucher's Disease, histiocytosis, and any other hyperproliferative disease, besides neoplasia, located in an organ system listed above.

One preferred embodiment utilizes polynucleotides of the present invention to inhibit aberrant cellular division, by gene therapy using the present invention, and/or protein fusions or fragments thereof.

Thus, the present invention provides a method for treating cell proliferative disorders by inserting into an abnormally proliferating cell a polynucleotide of the present invention, wherein said polynucleotide represses said expression.

Another embodiment of the present invention provides a method of treating cell-proliferative disorders in individuals comprising administration of one or more active gene copies of the present invention to an abnormally proliferating cell or cells. In a preferred embodiment, polynucleotides of the present invention is a DNA construct comprising a recombinant expression vector effective in expressing a DNA sequence encoding said polynucleotides. In another preferred embodiment of the present invention, the DNA construct encoding the poynucleotides of the present invention is inserted into cells to be treated utilizing a retrovirus, or more preferrably an adenoviral vector (See G J. Nabel, et. al., PNAS 1999 96: 324-326, which is hereby incorporated by reference). In a most preferred embodiment, the viral vector is defective and will not transform non-proliferating cells, only proliferating cells. Moreover, in a preferred embodiment, the polynucleotides of the present invention inserted into proliferating cells either alone, or in combination with or fused to other polynucleotides, can then be modulated via an external stimulus (i.e. magnetic, specific small molecule, chemical, or drug administration, etc.), which acts upon the promoter upstream of said polynucleotides to induce expression of the encoded protein product. As such the beneficial therapeutic affect of the present invention may be expressly modulated

(i.e. to increase, decrease, or inhibit expression of the present invention) based upon said external stimulus.

Polynucleotides of the present invention may be useful in repressing expression of oncogenic genes or antigens. By "repressing expression of the oncogenic genes " is intended the suppression of the transcription of the gene, the degradation of the gene transcript (pre-message RNA), the inhibition of splicing, the destruction of the messenger RNA, the prevention of the post-translational modifications of the protein, the destruction of the protein, or the inhibition of the normal function of the protein.

For local administration to abnormally proliferating cells, polynucleotides of the present invention may be administered by any method known to those of skill in the art including, but not limited to transfection, electroporation, microinjection of cells, or in vehicles such as liposomes, lipofectin, or as naked polynucleotides, or any other method described throughout the specification. The polynucleotide of the present invention may be delivered by known gene delivery systems such as, but not limited to, retroviral vectors (Gilboa, J. Virology 44:845 (1982); Hocke, Nature 320:275 (1986); Wilson, et al., Proc. Natl. Acad. Sci. U.S.A. 85:3014), vaccinia virus system (Chakrabarty et al., Mol. Cell Biol. 5:3403 (1985) or other efficient DNA delivery systems (Yates et al., Nature 313:812 (1985)) known to those skilled in the art. These references are exemplary only and are hereby incorporated by reference. In order to specifically deliver or transfect cells which are abnormally proliferating and spare non-dividing cells, it is preferable to utilize a retrovirus, or adenoviral (as described in the art and elsewhere herein) delivery system known to those of skill in the art. Since host DNA replication is required for retroviral DNA to integrate and the retrovirus will be unable to self replicate due to the lack of the retrovirus genes needed for its life cycle. Utilizing such a retroviral delivery system for polynucleotides of the present invention will target said gene and constructs to abnormally proliferating cells and will spare the non-dividing normal cells.

The polynucleotides of the present invention may be delivered directly to cell proliferative disorder/disease sites in internal organs, body cavities and the like by use of imaging devices used to guide an injecting needle directly to the disease site. The polynucleotides of the present invention may also be administered to disease sites at the time of surgical intervention.

By "cell proliferative disease" is meant any human or animal disease or disorder, affecting any one or any combination of organs, cavities, or body parts, which is characterized by single or multiple local abnormal proliferations of cells, groups of cells, or tissues, whether benign or malignant.

Any amount of the polynucleotides of the present invention may be administered as long as it has a biologically inhibiting effect on the proliferation of the treated cells. Moreover, it is possible to administer more than one of the polynucleotide of the present invention simultaneously to the same site. By "biologically inhibiting" is meant partial or total growth inhibition as well as decreases in the rate of proliferation or growth of the cells. The biologically inhibitory dose may be determined by assessing the effects of the polynucleotides of the present invention on target malignant or abnormally proliferating cell growth in tissue culture, tumor growth in animals and cell cultures. or any other method known to one of ordinary skill in the art.

The present invention is further directed to antibody-based therapies which involve administering of anti-polypeptides and anti-polynucleotide antibodies to a mammalian, preferably human, patient for treating one or more of the described disorders. Methods for producing anti-polypeptides and anti-polynucleotide antibodies polyclonal and monoclonal antibodies are described in detail elsewhere herein. Such antibodies may be provided in pharmaceutically acceptable compositions as known in the art or as described herein.

A summary of the ways in which the antibodies of the present invention may be used therapeutically includes binding polynucleotides or polypeptides of the present invention locally or systemically in the body or by direct cytotoxicity of the antibody, e.g. as mediated by complement (CDC) or by effector cells (ADCC). Some of these approaches are described in more detail below. Armed with the teachings provided herein, one of ordinary skill in the art will know how to use the antibodies of the present invention for diagnostic, monitoring or therapeutic purposes without undue experimentation.

In particular, the antibodies, fragments and derivatives of the present invention are useful for treating a subject having or developing cell proliferative and/or differentiation disorders as described herein. Such treatment comprises administering a single or multiple doses of the antibody, or a fragment. derivative. or a conjugate thereof.

The antibodies of this invention may be advantageously utilized in combination with other monoclonal or chimeric antibodies, or with lymphokines or hematopoietic growth

factors. for example., which serve to increase the number or activity of effector cells which interact with the antibodies.

It is preferred to use high affinity and/or potent in vivo inhibiting and/or neutralizing antibodies against polypeptides or polynucleotides of the present invention. fragments or regions thereof, for both immunoassays directed to and therapy of disorders related to polynucleotides or polypeptides, including fragements thereof, of the present invention. Such antibodies, fragments, or regions, will preferably have an affinity for polynucleotides or polypeptides, including fragements thereof. Preferred binding affinities include those with a dissociation constant or Kd less than $5X10^{-6}M$, $10^{-6}M$, $5X10^{-7}M$, $10^{-7}M$, $5X10^{-8}M$, $10^{-8}M$, $5X10^{-9}M$. $10^{-9}M$. $5X10^{-10}M$, $10^{-10}M$, $5X10^{-11}M$, $10^{-11}M$, $5X10^{-12}M$, $10^{-12}M$, $5X10^{-13}M$, $10^{-13}M$, $5X10^{-14}M$, $10^{-14}M$. $5X10^{-15}M$, and $10^{-15}M$.

Moreover, polypeptides of the present invention are useful in inhibiting the angiogenesis of proliferative cells or tissues, either alone, as a protein fusion, or in combination with other polypeptides directly or indirectly, as described elsewhere herein. In a most preferred embodiment, said anti-angiogenesis effect may be achieved indirectly, for example, through the inhibition of hematopoietic, tumor-specific cells, such as tumor-associated macrophages (See Joseph IB, et al. J Natl Cancer Inst, 90(21):1648-53 (1998), which is hereby incorporated by reference). Antibodies directed to polypeptides or polynucleotides of the present invention may also result in inhibition of angiogenesis directly, or indirectly (See Witte L, et al., Cancer Metastasis Rev. 17(2):155-61 (1998), which is hereby incorporated by reference)).

Polypeptides, including protein fusions, of the present invention, or fragments thereof may be useful in inhibiting proliferative cells or tissues through the induction of apoptosis. Said polypeptides may act either directly, or indirectly to induce apoptosis of proliferative cells and tissues, for example in the activation of a death-domain receptor, such as tumor necrosis factor (TNF) receptor-1, CD95 (Fas/APO-1), TNF-receptor-related apoptosis-mediated protein (TRAMP) and TNF-related apoptosis-inducing ligand (TRAIL) receptor-1 and -2 (See Schulze-Osthoff K, et.al., Eur J Biochem 254(3):439-59 (1998), which is hereby incorporated by reference). Moreover, in another preferred embodiment of the present invention. said polypeptides may induce apoptosis through other mechanisms, such as in the activation of other proteins which will activate apoptosis, or through stimulating the expression of said proteins, either alone or in combination with small molecule drugs or

adjuviants, such as apoptonin, galectins, thioredoxins, antiinflammatory proteins (See for example, Mutat Res 400(1-2):447-55 (1998), Med Hypotheses.50(5):423-33 (1998), Chem Biol Interact. Apr 24;111-112:23-34 (1998), J Mol Med.76(6):402-12 (1998), Int J Tissue React;20(1):3-15 (1998), which are all hereby incorporated by reference).

Polypeptides, including protein fusions to, or fragments thereof, of the present invention are useful in inhibiting the metastasis of proliferative cells or tissues. Inhibition may occur as a direct result of administering polypeptides, or antibodies directed to said polypeptides as described elsewere herein, or indirectly, such as activating the expression of proteins known to inhibit metastasis, for example alpha 4 integrins, (See, e.g., Curr Top Microbiol Immunol 1998;231:125-41, which is hereby incorporated by reference). Such thereapeutic affects of the present invention may be achieved either alone, or in combination with small molecule drugs or adjuvants.

In another embodiment, the invention provides a method of delivering compositions containing the polypeptides of the invention (e.g., compositions containing polypeptides or polypeptide antibodes associated with heterologous polypeptides, heterologous nucleic acids, toxins, or prodrugs) to targeted cells expressing the polypeptide of the present invention. Polypeptides or polypeptide antibodes of the invention may be associated with with heterologous polypeptides, heterologous nucleic acids, toxins, or prodrugs via hydrophobic, hydrophilic, ionic and/or covalent interactions. Polypeptides, protein fusions to, or fragments thereof, of the present invention are useful in enhancing the immunogenicity and/or antigenicity of proliferating cells or tissues, either directly, such as would occur if the polypeptides of the present invention 'vaccinated' the immune response to respond to proliferative antigens and immunogens, or indirectly, such as in activating the expression of proteins known to enhance the immune response (e.g. chemokines), to said antigens and immunogens.

Cardiovascular Disorders

Polynucleotides or polypeptides, or agonists or antagonists of the present invention, may be used to treat cardiovascular disorders, including peripheral artery disease, such as limb ischemia.

Cardiovascular disorders include cardiovascular abnormalities, such as arterio-arterial fistula, arteriovenous fistula, cerebral arteriovenous malformations, congenital heart defects,

pulmonary atresia, and Scimitar Syndrome. Congenital heart defects include aortic coarctation, cor triatriatum, coronary vessel anomalies, crisscross heart, dextrocardia, patent ductus arteriosus, Ebstein's anomaly, Eisenmenger complex, hypoplastic left heart syndrome, levocardia, tetralogy of fallot, transposition of great vessels, double outlet right ventricle, tricuspid atresia, persistent truncus arteriosus, and heart septal defects, such as aortopulmonary septal defect, endocardial cushion defects, Lutembacher's Syndrome, trilogy of Fallot, ventricular heart septal defects.

Cardiovascular disorders also include heart disease, such as arrhythmias, carcinoid heart disease, high cardiac output, low cardiac output, cardiac tamponade, endocarditis (including bacterial), heart aneurysm, cardiac arrest, congestive heart failure, congestive cardiomyopathy, paroxysmal dyspnea, cardiac edema, heart hypertrophy, congestive cardiomyopathy, left ventricular hypertrophy, right ventricular hypertrophy, post-infarction heart rupture, ventricular septal rupture, heart valve diseases, myocardial diseases, myocardial ischemia, pericardial effusion, pericarditis (including constrictive and tuberculous), pneumopericardium, postpericardiotomy syndrome, pulmonary heart disease, rheumatic heart disease, ventricular dysfunction, hyperemia, cardiovascular pregnancy complications, Scimitar Syndrome, cardiovascular syphilis, and cardiovascular tuberculosis.

Arrhythmias include sinus arrhythmia, atrial fibrillation, atrial flutter, bradycardia, extrasystole, Adams-Stokes Syndrome, bundle-branch block, sinoatrial block, long QT syndrome, parasystole, Lown-Ganong-Levine Syndrome, Mahaim-type pre-excitation syndrome, Wolff-Parkinson-White syndrome, sick sinus syndrome, tachycardias, and ventricular fibrillation. Tachycardias include paroxysmal tachycardia, supraventricular tachycardia, accelerated idioventricular rhythm, atrioventricular nodal reentry tachycardia, ectopic atrial tachycardia, ectopic junctional tachycardia, sinoatrial nodal reentry tachycardia, sinus tachycardia, Torsades de Pointes, and ventricular tachycardia.

Heart valve disease include aortic valve insufficiency, aortic valve stenosis, hear murmurs, aortic valve prolapse, mitral valve prolapse, tricuspid valve prolapse, mitral valve insufficiency, mitral valve stenosis, pulmonary atresia, pulmonary valve insufficiency, pulmonary valve stenosis, tricuspid atresia, tricuspid valve insufficiency, and tricuspid valve stenosis.

Myocardial diseases include alcoholic cardiomyopathy, congestive cardiomyopathy, hypertrophic cardiomyopathy, aortic subvalvular stenosis, pulmonary subvalvular stenosis,

restrictive cardiomyopathy, Chagas cardiomyopathy, endocardial fibroelastosis, endomyocardial fibrosis, Kearns Syndrome. myocardial reperfusion injury, and myocarditis.

Myocardial ischemias include coronary disease, such as angina pectoris, coronary aneurysm. coronary arteriosclerosis, coronary thrombosis, coronary vasospasm, myocardial infarction and myocardial stunning.

Cardiovascular diseases also include vascular diseases such as aneurysms, angiodysplasia, angiomatosis, bacillary angiomatosis, Hippel-Lindau Disease, Klippel-Trenaunay-Weber Syndrome, Sturge-Weber Syndrome, angioneurotic edema, aortic diseases, Takayasu's Arteritis, aortitis. Leriche's Syndrome, arterial occlusive diseases, arteritis, enarteritis, polyarteritis nodosa, cerebrovascular disorders, diabetic angiopathies, diabetic retinopathy. embolisms, thrombosis, erythromelalgia, hemorrhoids. hepatic veno-occlusive disease, hypertension, hypotension. ischemia. peripheral vascular diseases, phlebitis, pulmonary veno-occlusive disease, Raynaud's disease, CREST syndrome, retinal vein occlusion, Scimitar syndrome, superior vena cava syndrome, telangiectasia, atacia telangiectasia, hereditary hemorrhagic telangiectasia, varicocele, varicose veins, varicose ulcer, vasculitis, and venous insufficiency.

Aneurysms include dissecting aneurysms, false aneurysms, infected aneurysms, ruptured aneurysms, aortic aneurysms, cerebral aneurysms, coronary aneurysms, heart aneurysms, and iliac aneurysms.

Arterial occlusive diseases include arteriosclerosis. intermittent claudication, carotid stenosis, fibromuscular dysplasias, mesenteric vascular occlusion, Moyamoya disease, renal artery obstruction, retinal artery occlusion, and thromboangiitis obliterans.

Cerebrovascular disorders include carotid artery diseases, cerebral amyloid angiopathy, cerebral aneurysm, cerebral anoxia, cerebral arteriosclerosis, cerebral arteriovenous malformation, cerebral artery diseases, cerebral embolism and thrombosis, carotid artery thrombosis, sinus thrombosis, Wallenberg's syndrome, cerebral hemorrhage, epidural hematoma, subdural hematoma, subaraxhnoid hemorrhage, cerebral infarction, cerebral ischemia (including transient), subclavian steal syndrome, periventricular leukomalacia, vascular headache, cluster headache, migraine, and vertebrobasilar insufficiency.

Embolisms include air embolisms, amniotic fluid embolisms, cholesterol embolisms, blue toe syndrome, fat embolisms, pulmonary embolisms, and thromoboembolisms.

Thrombosis include coronary thrombosis, hepatic vein thrombosis, retinal vein occlusion, carotid artery thrombosis, sinus thrombosis, Wallenberg's syndrome, and thrombophlebitis.

Ischemia includes cerebral ischemia, ischemic colitis, compartment syndromes, anterior compartment syndrome, myocardial ischemia, reperfusion injuries, and peripheral limb ischemia. Vasculitis includes aortitis, arteritis, Behcet's Syndrome, Churg-Strauss Syndrome, mucocutaneous lymph node syndrome, thromboangiitis obliterans, hypersensitivity vasculitis, Schoenlein-Henoch purpura, allergic cutaneous vasculitis, and Wegener's granulomatosis.

Polynucleotides or polypeptides, or agonists or antagonists of the present invention, are especially effective for the treatment of critical limb ischemia and coronary disease.

Polypeptides may be administered using any method known in the art, including, but not limited to, direct needle injection at the delivery site, intravenous injection, topical administration, catheter infusion, biolistic injectors, particle accelerators, gelfoam sponge depots, other commercially available depot materials, osmotic pumps, oral or suppositorial solid pharmaceutical formulations, decanting or topical applications during surgery, aerosol delivery. Such methods are known in the art. Polypeptides may be administered as part of a Therapeutic, described in more detail below. Methods of delivering polynucleotides are described in more detail herein.

<u>Anti-Angiogenesis Activity</u>

The naturally occurring balance between endogenous stimulators and inhibitors of angiogenesis is one in which inhibitory influences predominate. Rastinejad *et al.*, *Cell* *56*:345-355 (1989). In those rare instances in which neovascularization occurs under normal physiological conditions, such as wound healing, organ regeneration, embryonic development, and female reproductive processes, angiogenesis is stringently regulated and spatially and temporally delimited. Under conditions of pathological angiogenesis such as that characterizing solid tumor growth, these regulatory controls fail. Unregulated angiogenesis becomes pathologic and sustains progression of many neoplastic and non-neoplastic diseases. A number of serious diseases are dominated by abnormal neovascularization including solid tumor growth and metastases, arthritis, some types of eye disorders, and psoriasis. See, e.g., reviews by Moses *et al.*, *Biotech.* *9*:630-634 (1991); Folkman *et al.*, *N. Engl. J. Med.*, *333*:1757-1763 (1995); Auerbach *et al.*, *J. Microvasc. Res.*

29:401-411 (1985); Folkman, Advances in Cancer Research, eds. Klein and Weinhouse, Academic Press, New York, pp. 175-203 (1985); Patz, *Am. J. Opthalmol. 94*:715-743 (1982); and Folkman *et al.*, Science *221*:719-725 (1983). In a number of pathological conditions, the process of angiogenesis contributes to the disease state. For example, significant data have accumulated which suggest that the growth of solid tumors is dependent on angiogenesis. Folkman and Klagsbrun, *Science 235*:442-447 (1987).

The polynucleotides encoding a polypeptide of the present invention may be administered along with other polynucleotides encoding an angiogenic protein. Examples of angiogenic proteins include, but are not limited to, acidic and basic fibroblast growth factors, VEGF-1, VEGF-2, VEGF-3, epidermal growth factor alpha and beta, platelet-derived endothelial cell growth factor, platelet-derived growth factor, tumor necrosis factor alpha, hepatocyte growth factor, insulin like growth factor, colony stimulating factor, macrophage colony stimulating factor, granulocyte/macrophage colony stimulating factor, and nitric oxide synthase.

The present invention provides for treatment of diseases or disorders associated with neovascularization by administration of the polynucleotides and/or polypeptides of the invention, as well as agonists or antagonists of the present invention. Malignant and metastatic conditions which can be treated with the polynucleotides and polypeptides, or agonists or antagonists of the invention include, but are not limited to, malignancies, solid tumors, and cancers described herein and otherwise known in the art (for a review of such disorders, see Fishman *et al.*, Medicine, 2d Ed., J. B. Lippincott Co., Philadelphia (1985)).Thus, the present invention provides a method of treating an angiogenesis-related disease and/or disorder, comprising administering to an individual in need thereof a therapeutically effective amount of a polynucleotide, polypeptide, antagonist and/or agonist of the invention. For example, polynucleotides, polypeptides, antagonists and/or agonists may be utilized in a variety of additional methods in order to therapeutically treat a cancer or tumor. Cancers which may be treated with polynucleotides, polypeptides, antagonists and/or agonists include, but are not limited to solid tumors, including colon, rectum, prostate, lung, breast, ovarian, stomach, pancreas, larynx, esophagus, testes, liver, parotid, biliary tract, cervix, uterus, endometrium, kidney, bladder, thyroid cancer; primary tumors and metastases; melanomas; glioblastoma; Kaposi's sarcoma; leiomyosarcoma; non- small cell lung cancer; colorectal cancer; advanced malignancies; and blood born tumors such as leukemias. For

example, polynucleotides, polypeptides, antagonists and/or agonists may be delivered topically, in order to treat cancers such as skin cancer, head and neck tumors, breast tumors, and Kaposi's sarcoma.

Within yet other aspects, polynucleotides, polypeptides, antagonists and/or agonists may be utilized to treat superficial forms of bladder cancer by, for example, intravesical administration. Polynucleotides, polypeptides, antagonists and/or agonists may be delivered directly into the tumor, or near the tumor site, via injection or a catheter. Of course, as the artisan of ordinary skill will appreciate, the appropriate mode of administration will vary according to the cancer to be treated. Other modes of delivery are discussed herein.

Polynucleotides, polypeptides, antagonists and/or agonists may be useful in treating other disorders, besides cancers, which involve angiogenesis. These disorders include, but are not limited to: benign tumors, for example hemangiomas, acoustic neuromas, neurofibromas, trachomas, and pyogenic granulomas; artheroscleric plaques; ocular angiogenic diseases, for example, diabetic retinopathy, retinopathy of prematurity, macular degeneration, corneal graft rejection, neovascular glaucoma, retrolental fibroplasia, rubeosis, retinoblastoma, uvietis and Pterygia (abnormal blood vessel growth) of the eye; rheumatoid arthritis; psoriasis; delayed wound healing; endometriosis; vasculogenesis; granulations; hypertrophic scars (keloids); nonunion fractures; scleroderma; trachoma; vascular adhesions; myocardial angiogenesis; coronary collaterals; cerebral collaterals; arteriovenous malformations; ischemic limb angiogenesis; Osler-Webber Syndrome; plaque neovascularization; telangiectasia; hemophiliac joints; angiofibroma; fibromuscular dysplasia; wound granulation; Crohn's disease; and atherosclerosis.

For example, within one aspect of the present invention methods are provided for treating hypertrophic scars and keloids, comprising the step of administering a polynucleotide, polypeptide, antagonist and/or agonist of the invention to a hypertrophic scar or keloid.

Within one embodiment of the present invention polynucleotides, polypeptides, antagonists and/or agonists are directly injected into a hypertrophic scar or keloid, in order to prevent the progression of these lesions. This therapy is of particular value in the prophylactic treatment of conditions which are known to result in the development of hypertrophic scars and keloids (e.g., burns), and is preferably initiated after the proliferative phase has had time to progress (approximately 14 days after the initial injury), but before

hypertrophic scar or keloid development. As noted above, the present invention also provides methods for treating neovascular diseases of the eye, including for example, corneal neovascularization, neovascular glaucoma, proliferative diabetic retinopathy, retrolental fibroplasia and macular degeneration.

Moreover, Ocular disorders associated with neovascularization which can be treated with the polynucleotides and polypeptides of the present invention (including agonists and/or antagonists) include, but are not limited to: neovascular glaucoma, diabetic retinopathy, retinoblastoma, retrolental fibroplasia, uveitis, retinopathy of prematurity macular degeneration, corneal graft neovascularization, as well as other eye inflammatory diseases, ocular tumors and diseases associated with choroidal or iris neovascularization. See, e.g., reviews by Waltman *et al.*, *Am. J. Ophthal.* *85*:704-710 (1978) and Gartner *et al.*, *Surv. Ophthal.* *22*:291-312 (1978).

Thus, within one aspect of the present invention methods are provided for treating neovascular diseases of the eye such as corneal neovascularization (including corneal graft neovascularization), comprising the step of administering to a patient a therapeutically effective amount of a compound (as described above) to the cornea, such that the formation of blood vessels is inhibited. Briefly, the cornea is a tissue which normally lacks blood vessels. In certain pathological conditions however, capillaries may extend into the cornea from the pericorneal vascular plexus of the limbus. When the cornea becomes vascularized, it also becomes clouded, resulting in a decline in the patient's visual acuity. Visual loss may become complete if the cornea completely opacitates. A wide variety of disorders can result in corneal neovascularization, including for example, corneal infections (e.g., trachoma, herpes simplex keratitis, leishmaniasis and onchocerciasis), immunological processes (e.g., graft rejection and Stevens-Johnson's syndrome), alkali burns, trauma, inflammation (of any cause), toxic and nutritional deficiency states, and as a complication of wearing contact lenses.

Within particularly preferred embodiments of the invention, may be prepared for topical administration in saline (combined with any of the preservatives and antimicrobial agents commonly used in ocular preparations), and administered in eyedrop form. The solution or suspension may be prepared in its pure form and administered several times daily. Alternatively, anti-angiogenic compositions, prepared as described above, may also be administered directly to the cornea. Within preferred embodiments, the anti-angiogenic

composition is prepared with a muco-adhesive polymer which binds to cornea. Within further embodiments, the anti-angiogenic factors or anti-angiogenic compositions may be utilized as an adjunct to conventional steroid therapy. Topical therapy may also be useful prophylactically in corneal lesions which are known to have a high probability of inducing an angiogenic response (such as chemical burns). In these instances the treatment, likely in combination with steroids, may be instituted immediately to help prevent subsequent complications.

Within other embodiments, the compounds described above may be injected directly into the corneal stroma by an ophthalmologist under microscopic guidance. The preferred site of injection may vary with the morphology of the individual lesion, but the goal of the administration would be to place the composition at the advancing front of the vasculature (i.e., interspersed between the blood vessels and the normal cornea). In most cases this would involve perilimbic corneal injection to "protect" the cornea from the advancing blood vessels. This method may also be utilized shortly after a corneal insult in order to prophylactically prevent corneal neovascularization. In this situation the material could be injected in the perilimbic cornea interspersed between the corneal lesion and its undesired potential limbic blood supply. Such methods may also be utilized in a similar fashion to prevent capillary invasion of transplanted corneas. In a sustained-release form injections might only be required 2-3 times per year. A steroid could also be added to the injection solution to reduce inflammation resulting from the injection itself.

Within another aspect of the present invention, methods are provided for treating neovascular glaucoma, comprising the step of administering to a patient a therapeutically effective amount of a polynucleotide, polypeptide, antagonist and/or agonist to the eye, such that the formation of blood vessels is inhibited. In one embodiment, the compound may be administered topically to the eye in order to treat early forms of neovascular glaucoma. Within other embodiments, the compound may be implanted by injection into the region of the anterior chamber angle. Within other embodiments, the compound may also be placed in any location such that the compound is continuously released into the aqueous humor. Within another aspect of the present invention, methods are provided for treating proliferative diabetic retinopathy, comprising the step of administering to a patient a therapeutically effective amount of a polynucleotide, polypeptide, antagonist and/or agonist to the eyes, such that the formation of blood vessels is inhibited.

Within particularly preferred embodiments of the invention, proliferative diabetic retinopathy may be treated by injection into the aqueous humor or the vitreous, in order to increase the local concentration of the polynucleotide, polypeptide, antagonist and/or agonist in the retina. Preferably, this treatment should be initiated prior to the acquisition of severe disease requiring photocoagulation.

Within another aspect of the present invention, methods are provided for treating retrolental fibroplasia, comprising the step of administering to a patient a therapeutically effective amount of a polynucleotide, polypeptide, antagonist and/or agonist to the eye, such that the formation of blood vessels is inhibited. The compound may be administered topically, via intravitreous injection and/or via intraocular implants.

Additionally, disorders which can be treated with the polynucleotides, polypeptides, agonists and/or agonists include, but are not limited to, hemangioma, arthritis, psoriasis, angiofibroma, atherosclerotic plaques, delayed wound healing, granulations, hemophilic joints, hypertrophic scars, nonunion fractures, Osler-Weber syndrome, pyogenic granuloma, scleroderma, trachoma, and vascular adhesions.

Moreover, disorders and/or states, which can be treated with be treated with the the polynucleotides, polypeptides, agonists and/or agonists include, but are not limited to, solid tumors, blood born tumors such as leukemias, tumor metastasis, Kaposi's sarcoma, benign tumors, for example hemangiomas, acoustic neuromas, neurofibromas, trachomas, and pyogenic granulomas, rheumatoid arthritis, psoriasis, ocular angiogenic diseases, for example, diabetic retinopathy, retinopathy of prematurity, macular degeneration, corneal graft rejection, neovascular glaucoma, retrolental fibroplasia, rubeosis, retinoblastoma, and uvietis, delayed wound healing, endometriosis, vascluogenesis, granulations, hypertrophic scars (keloids), nonunion fractures, scleroderma, trachoma, vascular adhesions, myocardial angiogenesis, coronary collaterals, cerebral collaterals, arteriovenous malformations, ischemic limb angiogenesis, Osler-Webber Syndrome, plaque neovascularization, telangiectasia, hemophiliac joints, angiofibroma fibromuscular dysplasia, wound granulation, Crohn's disease, atherosclerosis, birth control agent by preventing vascularization required for embryo implantation controlling menstruation, diseases that have angiogenesis as a pathologic consequence such as cat scratch disease (Rochele minalia quintosa), ulcers (Helicobacter pylori), Bartonellosis and bacillary angiomatosis.

In one aspect of the birth control method. an amount of the compound sufficient to block embryo implantation is administered before or after intercourse and fertilization have occurred, thus providing an effective method of birth control, possibly a "morning after" method. Polynucleotides, polypeptides, agonists and/or agonists may also be used in controlling menstruation or administered as either a peritoneal lavage fluid or for peritoneal implantation in the treatment of endometriosis.

Polynucleotides, polypeptides, agonists and/or agonists of the present invention may be incorporated into surgical sutures in order to prevent stitch granulomas.

Polynucleotides, polypeptides, agonists and/or agonists may be utilized in a wide variety of surgical procedures. For example, within one aspect of the present invention a compositions (in the form of, for example, a spray or film) may be utilized to coat or spray an area prior to removal of a tumor, in order to isolate normal surrounding tissues from malignant tissue, and/or to prevent the spread of disease to surrounding tissues. Within other aspects of the present invention, compositions (e.g., in the form of a spray) may be delivered via endoscopic procedures in order to coat tumors, or inhibit angiogenesis in a desired locale. Within yet other aspects of the present invention, surgical meshes which have been coated with anti- angiogenic compositions of the present invention may be utilized in any procedure wherein a surgical mesh might be utilized. For example, within one embodiment of the invention a surgical mesh laden with an anti-angiogenic composition may be utilized during abdominal cancer resection surgery (e.g., subsequent to colon resection) in order to provide support to the structure, and to release an amount of the anti-angiogenic factor.

Within further aspects of the present invention, methods are provided for treating tumor excision sites, comprising administering a polynucleotide, polypeptide, agonist and/or agonist to the resection margins of a tumor subsequent to excision, such that the local recurrence of cancer and the formation of new blood vessels at the site is inhibited. Within one embodiment of the invention, the anti-angiogenic compound is administered directly to the tumor excision site (e.g., applied by swabbing, brushing or otherwise coating the resection margins of the tumor with the anti-angiogenic compound). Alternatively, the anti-angiogenic compounds may be incorporated into known surgical pastes prior to administration. Within particularly preferred embodiments of the invention. the anti-angiogenic compounds are applied after hepatic resections for malignancy, and after neurosurgical operations.

Within one aspect of the present invention, polynucleotides, polypeptides, agonists and/or agonists may be administered to the resection margin of a wide variety of tumors, including for example, breast, colon, brain and hepatic tumors. For example, within one embodiment of the invention, anti-angiogenic compounds may be administered to the site of a neurological tumor subsequent to excision, such that the formation of new blood vessels at the site are inhibited.

The polynucleotides, polypeptides, agonists and/or agonists of the present invention may also be administered along with other anti-angiogenic factors. Representative examples of other anti-angiogenic factors include: Anti-Invasive Factor, retinoic acid and derivatives thereof, paclitaxel, Suramin, Tissue Inhibitor of Metalloproteinase-1, Tissue Inhibitor of Metalloproteinase-2, Plasminogen Activator Inhibitor-1, Plasminogen Activator Inhibitor-2, and various forms of the lighter "d group" transition metals.

Lighter "d group" transition metals include, for example, vanadium, molybdenum, tungsten, titanium, niobium, and tantalum species. Such transition metal species may form transition metal complexes. Suitable complexes of the above-mentioned transition metal species include oxo transition metal complexes.

Representative examples of vanadium complexes include oxo vanadium complexes such as vanadate and vanadyl complexes. Suitable vanadate complexes include metavanadate and orthovanadate complexes such as, for example, ammonium metavanadate, sodium metavanadate, and sodium orthovanadate. Suitable vanadyl complexes include, for example, vanadyl acetylacetonate and vanadyl sulfate including vanadyl sulfate hydrates such as vanadyl sulfate mono- and trihydrates.

Representative examples of tungsten and molybdenum complexes also include oxo complexes. Suitable oxo tungsten complexes include tungstate and tungsten oxide complexes. Suitable tungstate complexes include ammonium tungstate, calcium tungstate, sodium tungstate dihydrate, and tungstic acid. Suitable tungsten oxides include tungsten (IV) oxide and tungsten (VI) oxide. Suitable oxo molybdenum complexes include molybdate, molybdenum oxide, and molybdenyl complexes. Suitable molybdate complexes include ammonium molybdate and its hydrates, sodium molybdate and its hydrates, and potassium molybdate and its hydrates. Suitable molybdenum oxides include molybdenum (VI) oxide, molybdenum (VI) oxide, and molybdic acid. Suitable molybdenyl complexes include, for

example. molybdenyl acetylacetonate. Other suitable tungsten and molybdenum complexes include hydroxo derivatives derived from. for example, glycerol. tartaric acid, and sugars.

A wide variety of other anti-angiogenic factors may also be utilized within the context of the present invention. Representative examples include platelet factor 4; protamine sulphate: sulphated chitin derivatives (prepared from queen crab shells), (Murata et al., Cancer Res. 51:22-26, 1991); Sulphated Polysaccharide Peptidoglycan Complex (SP- PG) (the function of this compound may be enhanced by the presence of steroids such as estrogen, and tamoxifen citrate); Staurosporine; modulators of matrix metabolism, including for example, proline analogs, cishydroxyproline, d,L-3,4-dehydroproline, Thiaproline, alpha,alpha-dipyridyl, aminopropionitrile fumarate; 4-propyl-5-(4-pyridinyl)-2(3H)-oxazolone; Methotrexate; Mitoxantrone; Heparin; Interferons; 2 Macroglobulin-serum; ChIMP-3 (Pavloff et al., J. Bio. Chem. 267:17321-17326, 1992); Chymostatin (Tomkinson et al., Biochem J. 286:475-480, 1992); Cyclodextrin Tetradecasulfate; Eponemycin; Camptothecin; Fumagillin (Ingber et al., Nature 348:555-557, 1990); Gold Sodium Thiomalate ("GST"; Matsubara and Ziff, J. Clin. Invest. 79:1440-1446, 1987); anticollagenase-serum; alpha2-antiplasmin (Holmes et al., J. Biol. Chem. 262(4):1659-1664, 1987); Bisantrene (National Cancer Institute); Lobenzarit disodium (N-(2)-carboxyphenyl-4-chloroanthronilic acid disodium or "CCA"; Takeuchi et al., Agents Actions 36:312-316, 1992); Thalidomide; Angostatic steroid; AGM-1470; carboxynaminolmidazole; and metalloproteinase inhibitors such as BB94.

__Diseases at the Cellular Level__

Diseases associated with increased cell survival or the inhibition of apoptosis that could be treated or detected by polynucleotides or polypeptides, as well as antagonists or agonists of the present invention, include cancers (such as follicular lymphomas, carcinomas with p53 mutations, and hormone-dependent tumors, including, but not limited to colon cancer, cardiac tumors, pancreatic cancer, melanoma, retinoblastoma, glioblastoma, lung cancer, intestinal cancer, testicular cancer, stomach cancer, neuroblastoma, myxoma, myoma, lymphoma, endothelioma, osteoblastoma, osteoclastoma, osteosarcoma, chondrosarcoma, adenoma. breast cancer, prostate cancer, Kaposi's sarcoma and ovarian cancer); autoimmune disorders (such as, multiple sclerosis, Sjogren's syndrome, Hashimoto's thyroiditis, biliary cirrhosis, Behcet's disease, Crohn's disease, polymyositis, systemic lupus erythematosus and

immune-related glomerulonephritis and rheumatoid arthritis) and viral infections (such as herpes viruses, pox viruses and adenoviruses), inflammation, graft v. host disease, acute graft rejection, and chronic graft rejection. In preferred embodiments. polynucleotides, polypeptides. and/or antagonists of the invention are used to inhibit growth. progression, and/or metasis of cancers. in particular those listed above.

Additional diseases or conditions associated with increased cell survival that could be treated or detected by polynucleotides or polypeptides. or agonists or antagonists of the present invention include, but are not limited to, progression, and/or metastases of malignancies and related disorders such as leukemia (including acute leukemias (e.g., acute lymphocytic leukemia, acute myelocytic leukemia (including myeloblastic, promyelocytic, myelomonocytic, monocytic, and erythroleukemia)) and chronic leukemias (e.g., chronic myelocytic (granulocytic) leukemia and chronic lymphocytic leukemia)), polycythemia vera, lymphomas (e.g., Hodgkin's disease and non-Hodgkin's disease), multiple myeloma, Waldenstrom's macroglobulinemia, heavy chain disease, and solid tumors including, but not limited to, sarcomas and carcinomas such as fibrosarcoma, myxosarcoma, liposarcoma, chondrosarcoma, osteogenic sarcoma, chordoma, angiosarcoma, endotheliosarcoma, lymphangiosarcoma, lymphangioendotheliosarcoma, synovioma, mesothelioma, Ewing's tumor, leiomyosarcoma, rhabdomyosarcoma, colon carcinoma, pancreatic cancer, breast cancer, ovarian cancer, prostate cancer, squamous cell carcinoma, basal cell carcinoma, adenocarcinoma, sweat gland carcinoma, sebaceous gland carcinoma, papillary carcinoma, papillary adenocarcinomas, cystadenocarcinoma, medullary carcinoma, bronchogenic carcinoma, renal cell carcinoma, hepatoma, bile duct carcinoma, choriocarcinoma, seminoma, embryonal carcinoma, Wilm's tumor, cervical cancer, testicular tumor, lung carcinoma, small cell lung carcinoma, bladder carcinoma, epithelial carcinoma, glioma, astrocytoma, medulloblastoma, craniopharyngioma, ependymoma, pinealoma, hemangioblastoma, acoustic neuroma, oligodendroglioma, menangioma, melanoma, neuroblastoma, and retinoblastoma.

Diseases associated with increased apoptosis that could be treated or detected by polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, include AIDS; neurodegenerative disorders (such as Alzheimer's disease. Parkinson's disease, Amyotrophic lateral sclerosis, Retinitis pigmentosa, Cerebellar degeneration and brain tumor or prior associated disease); autoimmune disorders (such as, multiple sclerosis, Sjogren's

syndrome. Hashimoto's thyroiditis, biliary cirrhosis, Behcet's disease, Crohn's disease, polymyositis, systemic lupus erythematosus and immune-related glomerulonephritis and rheumatoid arthritis) myelodysplastic syndromes (such as aplastic anemia), graft v. host disease, ischemic injury (such as that caused by myocardial infarction, stroke and reperfusion injury), liver injury (e.g., hepatitis related liver injury, ischemia/reperfusion injury, cholestosis (bile duct injury) and liver cancer); toxin-induced liver disease (such as that caused by alcohol), septic shock, cachexia and anorexia.

Wound Healing and Epithelial Cell Proliferation

In accordance with yet a further aspect of the present invention, there is provided a process for utilizing polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, for therapeutic purposes, for example, to stimulate epithelial cell proliferation and basal keratinocytes for the purpose of wound healing, and to stimulate hair follicle production and healing of dermal wounds. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, may be clinically useful in stimulating wound healing including surgical wounds, excisional wounds, deep wounds involving damage of the dermis and epidermis, eye tissue wounds, dental tissue wounds, oral cavity wounds, diabetic ulcers, dermal ulcers, cubitus ulcers, arterial ulcers, venous stasis ulcers, burns resulting from heat exposure or chemicals, and other abnormal wound healing conditions such as uremia, malnutrition, vitamin deficiencies and complications associted with systemic treatment with steroids, radiation therapy and antineoplastic drugs and antimetabolites. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to promote dermal reestablishment subsequent to dermal loss

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to increase the adherence of skin grafts to a wound bed and to stimulate re-epithelialization from the wound bed. The following are types of grafts that polynucleotides or polypeptides, agonists or antagonists of the present invention, could be used to increase adherence to a wound bed: autografts, artificial skin, allografts, autodermic graft, autoepdermic grafts, avacular grafts, Blair-Brown grafts, bone graft, brephoplastic grafts, cutis graft, delayed graft, dermic graft, epidermic graft, fascia graft, full thickness graft, heterologous graft, xenograft, homologous graft, hyperplastic graft, lamellar graft,

mesh graft, mucosal graft, Ollier-Thiersch graft, omenpal graft, patch graft, pedicle graft, penetrating graft, split skin graft, thick split graft. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, can be used to promote skin strength and to improve the appearance of aged skin.

It is believed that polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, will also produce changes in hepatocyte proliferation, and epithelial cell proliferation in the lung, breast, pancreas, stomach, small intesting, and large intestine. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could promote proliferation of epithelial cells such as sebocytes, hair follicles, hepatocytes, type II pneumocytes, mucin-producing goblet cells, and other epithelial cells and their progenitors contained within the skin, lung, liver, and gastrointestinal tract. Polynucleotides or polypeptides, agonists or antagonists of the present invention, may promote proliferation of endothelial cells, keratinocytes, and basal keratinocytes.

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could also be used to reduce the side effects of gut toxicity that result from radiation, chemotherapy treatments or viral infections. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, may have a cytoprotective effect on the small intestine mucosa. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, may also stimulate healing of mucositis (mouth ulcers) that result from chemotherapy and viral infections.

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could further be used in full regeneration of skin in full and partial thickness skin defects, including burns, (i.e., repopulation of hair follicles, sweat glands, and sebaceous glands), treatment of other skin defects such as psoriasis. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to treat epidermolysis bullosa, a defect in adherence of the epidermis to the underlying dermis which results in frequent, open and painful blisters by accelerating reepithelialization of these lesions. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could also be used to treat gastric and doudenal ulcers and help heal by scar formation of the mucosal lining and regeneration of glandular mucosa and duodenal mucosal lining more rapidly. Inflamamatory bowel diseases, such as Crohn's disease and ulcerative colitis, are diseases which result in destruction of the mucosal surface of the small or large intestine,

respectively. Thus, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to promote the resurfacing of the mucosal surface to aid more rapid healing and to prevent progression of inflammatory bowel disease. Treatment with polynucleotides or polypeptides, agonists or antagonists of the present invention, is expected to have a significant effect on the production of mucus throughout the gastrointestinal tract and could be used to protect the intestinal mucosa from injurious substances that are ingested or following surgery. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to treat diseases associate with the under expression.

Moreover, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to prevent and heal damage to the lungs due to various pathological states. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, which could stimulate proliferation and differentiation and promote the repair of alveoli and brochiolar epithelium to prevent or treat acute or chronic lung damage. For example, emphysema, which results in the progressive loss of aveoli, and inhalation injuries, i.e., resulting from smoke inhalation and burns, that cause necrosis of the bronchiolar epithelium and alveoli could be effectively treated using polynucleotides or polypeptides, agonists or antagonists of the present invention. Also, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to stimulate the proliferation of and differentiation of type II pneumocytes, which may help treat or prevent disease such as hyaline membrane diseases, such as infant respiratory distress syndrome and bronchopulmonary displasia, in premature infants.

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could stimulate the proliferation and differentiation of hepatocytes and, thus, could be used to alleviate or treat liver diseases and pathologies such as fulminant liver failure caused by cirrhosis, liver damage caused by viral hepatitis and toxic substances (i.e., acetaminophen, carbon tetraholoride and other hepatotoxins known in the art).

In addition, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used treat or prevent the onset of diabetes mellitus. In patients with newly diagnosed Types I and II diabetes, where some islet cell function remains, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used to maintain the islet function so as to alleviate, delay or prevent permanent

manifestation of the disease. Also, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, could be used as an auxiliary in islet cell transplantation to improve or promote islet cell function.

Neurological Diseases

In accordance with yet a further aspect of the present invention, there is provided a process for utilizing polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, for therapeutic purposes, for example, to stimulate neurological cell proliferation and/or differentiation. Therefore, polynucleotides, polypeptides, agonists and/or antagonists of the invention may be used to treat and/or detect neurologic diseases. Moreover, polynucleotides or polypeptides, or agonists or antagonists of the invention, can be used as a marker or detector of a particular nervous system disease or disorder.

Examples of neurologic diseases which can be treated or detected with polynucleotides, polypeptides, agonists, and/or antagonists of the present invention include brain diseases, such as metabolic brain diseases which includes phenylketonuria such as maternal phenylketonuria, pyruvate carboxylase deficiency, pyruvate dehydrogenase complex deficiency, Wernicke's Encephalopathy, brain edema, brain neoplasms such as cerebellar neoplasms which include infratentorial neoplasms, cerebral ventricle neoplasms such as choroid plexus neoplasms, hypothalamic neoplasms, supratentorial neoplasms, canavan disease, cerebellar diseases such as cerebellar ataxia which include spinocerebellar degeneration such as ataxia telangiectasia, cerebellar dyssynergia, Friederich's Ataxia, Machado-Joseph Disease, olivopontocerebellar atrophy, cerebellar neoplasms such as infratentorial neoplasms, diffuse cerebral sclerosis such as encephalitis periaxialis, globoid cell leukodystrophy, metachromatic leukodystrophy and subacute sclerosing panencephalitis, cerebrovascular disorders (such as carotid artery diseases which include carotid artery thrombosis, carotid stenosis and Moyamoya Disease, cerebral amyloid angiopathy, cerebral aneurysm, cerebral anoxia, cerebral arteriosclerosis, cerebral arteriovenous malformations, cerebral artery diseases, cerebral embolism and thrombosis such as carotid artery thrombosis, sinus thrombosis and Wallenberg's Syndrome, cerebral hemorrhage such as epidural hematoma, subdural hematoma and subarachnoid hemorrhage, cerebral infarction, cerebral ischemia such as transient cerebral ischemia, Subclavian Steal Syndrome and vertebrobasilar insufficiency, vascular dementia such as multi-infarct dementia, periventricular leukomalacia,

vascular headache such as cluster headache. migraine. dementia such as AIDS Dementia Complex. presenile dementia such as Alzheimer's Disease and Creutzfeldt-Jakob Syndrome, senile dementia such as Alzheimer's Disease and progressive supranuclear palsy, vascular dementia such as multi-infarct dementia, encephalitis which include encephalitis periaxialis, viral encephalitis such as epidemic encephalitis, Japanese Encephalitis, St. Louis Encephalitis, tick-borne encephalitis and West Nile Fever, acute disseminated encephalomyelitis, meningoencephalitis such as uveomeningoencephalitic syndrome, Postencephalitic Parkinson Disease and subacute sclerosing panencephalitis, encephalomalacia such as periventricular leukomalacia, epilepsy such as generalized epilepsy which includes infantile spasms, absence epilepsy, myoclonic epilepsy which includes MERRF Syndrome, tonic-clonic epilepsy, partial epilepsy such as complex partial epilepsy, frontal lobe epilepsy and temporal lobe epilepsy, post-traumatic epilepsy, status epilepticus such as Epilepsia Partialis Continua, Hallervorden-Spatz Syndrome, hydrocephalus such as Dandy-Walker Syndrome and normal pressure hydrocephalus, hypothalamic diseases such as hypothalamic neoplasms, cerebral malaria, narcolepsy which includes cataplexy, bulbar poliomyelitis, cerebri pseudotumor, Rett Syndrome, Reye's Syndrome, thalamic diseases, cerebral toxoplasmosis, intracranial tuberculoma and Zellweger Syndrome, central nervous system infections such as AIDS Dementia Complex, Brain Abscess, subdural empyema, encephalomyelitis such as Equine Encephalomyelitis, Venezuelan Equine Encephalomyelitis, Necrotizing Hemorrhagic Encephalomyelitis, Visna, cerebral malaria, meningitis such as arachnoiditis, aseptic meningtitis such as viral meningtitis which includes lymphocytic choriomeningitis. Bacterial meningtitis which includes Haemophilus Meningtitis, Listeria Meningtitis. Meningococcal Meningtitis such as Waterhouse-Friderichsen Syndrome, Pneumococcal Meningtitis and meningeal tuberculosis, fungal meningitis such as Cryptococcal Meningtitis, subdural effusion, meningoencephalitis such as uvemeningoencephalitic syndrome, myelitis such as transverse myelitis, neurosyphilis such as tabes dorsalis, poliomyelitis which includes bulbar poliomyelitis and postpoliomyelitis syndrome, prion diseases (such as Creutzfeldt-Jakob Syndrome, Bovine Spongiform Encephalopathy, Gerstmann-Straussler Syndrome, Kuru, Scrapie) cerebral toxoplasmosis, central nervous system neoplasms such as brain neoplasms that include cerebellear neoplasms such as infratentorial neoplasms, cerebral ventricle neoplasms such as choroid plexus neoplasms, hypothalamic neoplasms and supratentorial neoplasms, meningeal

neoplasms, spinal cord neoplasms which include epidural neoplasms, demyelinating diseases such as Canavan Diseases, diffuse cerebral sceloris which includes adrenoleukodystrophy, encephalitis periaxialis, globoid cell leukodystrophy, diffuse cerebral sclerosis such as metachromatic leukodystrophy, allergic encephalomyelitis, necrotizing hemorrhagic encephalomyelitis, progressive multifocal leukoencephalopathy, multiple sclerosis, central pontine myelinolysis, transverse myelitis, neuromyelitis optica, Scrapie, Swayback, Chronic Fatigue Syndrome, Visna, High Pressure Nervous Syndrome, Meningism, spinal cord diseases such as amyotonia congenita, amyotrophic lateral sclerosis, spinal muscular atrophy such as Werdnig-Hoffmann Disease, spinal cord compression, spinal cord neoplasms such as epidural neoplasms, syringomyelia, Tabes Dorsalis, Stiff-Man Syndrome, mental retardation such as Angelman Syndrome, Cri-du-Chat Syndrome, De Lange's Syndrome, Down Syndrome, Gangliosidoses such as gangliosidoses G(M1), Sandhoff Disease, Tay-Sachs Disease, Hartnup Disease, homocystinuria, Laurence-Moon- Biedl Syndrome, Lesch-Nyhan Syndrome, Maple Syrup Urine Disease, mucolipidosis such as fucosidosis, neuronal ceroid-lipofuscinosis, oculocerebrorenal syndrome, phenylketonuria such as maternal phenylketonuria, Prader-Willi Syndrome, Rett Syndrome, Rubinstein-Taybi Syndrome, Tuberous Sclerosis, WAGR Syndrome, nervous system abnormalities such as holoprosencephaly, neural tube defects such as anencephaly which includes hydrangencephaly, Arnold-Chairi Deformity, encephalocele, meningocele, meningomyelocele, spinal dysraphism such as spina bifida cystica and spina bifida occulta, hereditary motor and sensory neuropathies which include Charcot-Marie Disease, Hereditary optic atrophy, Refsum's Disease, hereditary spastic paraplegia, Werdnig-Hoffmann Disease, Hereditary Sensory and Autonomic Neuropathies such as Congenital Analgesia and Familial Dysautonomia, Neurologic manifestations (such as agnosia that include Gerstmann's Syndrome, Amnesia such as retrograde amnesia, apraxia, neurogenic bladder, cataplexy, communicative disorders such as hearing disorders that includes deafness, partial hearing loss, loudness recruitment and tinnitus, language disorders such as aphasia which include agraphia, anomia, broca aphasia, and Wernicke Aphasia, Dyslexia such as Acquired Dyslexia, language development disorders, speech disorders such as aphasia which includes anomia, broca aphasia and Wernicke Aphasia, articulation disorders, communicative disorders such as speech disorders which include dysarthria, echolalia, mutism and stuttering, voice disorders such as aphonia and hoarseness, decerebrate state, delirium, fasciculation,

hallucinations. meningism. movement disorders such as angelman syndrome, ataxia. athetosis. chorea. dystonia, hypokinesia, muscle hypotonia. myoclonus. tic, torticollis and tremor, muscle hypertonia such as muscle rigidity such as stiff-man syndrome, muscle spasticity, paralysis such as facial paralysis which includes Herpes Zoster Oticus, Gastroparesis. Hemiplegia, ophthalmoplegia such as diplopia, Duane's Syndrome, Horner's Syndrome, Chronic progressive external ophthalmoplegia such as Kearns Syndrome, Bulbar Paralysis, Tropical Spastic Paraparesis. Paraplegia such as Brown-Sequard Syndrome, quadriplegia, respiratory paralysis and vocal cord paralysis, paresis, phantom limb, taste disorders such as ageusia and dysgeusia, vision disorders such as amblyopia, blindness, color vision defects, diplopia, hemianopsia. scotoma and subnormal vision, sleep disorders such as hypersomnia which includes Kleine-Levin Syndrome, insomnia, and somnambulism, spasm such as trismus. unconsciousness such as coma, persistent vegetative state and syncope and vertigo, neuromuscular diseases such as amyotonia congenita, amyotrophic lateral sclerosis, Lambert-Eaton Myasthenic Syndrome, motor neuron disease, muscular atrophy such as spinal muscular atrophy, Charcot-Marie Disease and Werdnig-Hoffmann Disease, Postpoliomyelitis Syndrome, Muscular Dystrophy, Myasthenia Gravis, Myotonia Atrophica, Myotonia Confenita, Nemaline Myopathy, Familial Periodic Paralysis, Multiplex Paramyloclonus, Tropical Spastic Paraparesis and Stiff-Man Syndrome, peripheral nervous system diseases such as acrodynia, amyloid neuropathies, autonomic nervous system diseases such as Adie's Syndrome, Barre-Lieou Syndrome, Familial Dysautonomia, Horner's Syndrome, Reflex Sympathetic Dystrophy and Shy-Drager Syndrome, Cranial Nerve Diseases such as Acoustic Nerve Diseases such as Acoustic Neuroma which includes Neurofibromatosis 2, Facial Nerve Diseases such as Facial Neuralgia,Melkersson-Rosenthal Syndrome, ocular motility disorders which includes amblyopia, nystagmus, oculomotor nerve paralysis, ophthalmoplegia such as Duane's Syndrome, Horner's Syndrome, Chronic Progressive External Ophthalmoplegia which includes Kearns Syndrome, Strabismus such as Esotropia and Exotropia, Oculomotor Nerve Paralysis, Optic Nerve Diseases such as Optic Atrophy which includes Hereditary Optic Atrophy, Optic Disk Drusen. Optic Neuritis such as Neuromyelitis Optica, Papilledema, Trigeminal Neuralgia, Vocal Cord Paralysis, Demyelinating Diseases such as Neuromyelitis Optica and Swayback. Diabetic neuropathies such as diabetic foot, nerve compression syndromes such as carpal tunnel syndrome, tarsal tunnel syndrome, thoracic outlet syndrome such as cervical rib syndrome, ulnar nerve

compression syndrome, neuralgia such as causalgia, cervico-brachial neuralgia, facial neuralgia and trigeminal neuralgia, neuritis such as experimental allergic neuritis, optic neuritis, polyneuritis, polyradiculoneuritis and radiculities such as polyradiculitis, hereditary motor and sensory neuropathies such as Charcot-Marie Disease, Hereditary Optic Atrophy, Refsum's Disease, Hereditary Spastic Paraplegia and Werdnig-Hoffmann Disease, Hereditary Sensory and Autonomic Neuropathies which include Congenital Analgesia and Familial Dysautonomia, POEMS Syndrome, Sciatica, Gustatory Sweating and Tetany).

Infectious Disease

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention can be used to treat or detect infectious agents. For example, by increasing the immune response, particularly increasing the proliferation and differentiation of B and/or T cells, infectious diseases may be treated. The immune response may be increased by either enhancing an existing immune response, or by initiating a new immune response. Alternatively, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention may also directly inhibit the infectious agent, without necessarily eliciting an immune response.

Viruses are one example of an infectious agent that can cause disease or symptoms that can be treated or detected by a polynucleotide or polypeptide and/or agonist or antagonist of the present invention. Examples of viruses, include, but are not limited to Examples of viruses, include, but are not limited to the following DNA and RNA viruses and viral families: Arbovirus, Adenoviridae, Arenaviridae, Arterivirus, Birnaviridae, Bunyaviridae, Caliciviridae, Circoviridae, Coronaviridae, Dengue, EBV, HIV, Flaviviridae, Hepadnaviridae (Hepatitis), Herpesviridae (such as, Cytomegalovirus, Herpes Simplex, Herpes Zoster), Mononegavirus (e.g., Paramyxoviridae, Morbillivirus, Rhabdoviridae), Orthomyxoviridae (e.g., Influenza A, Influenza B, and parainfluenza), Papiloma virus, Papovaviridae, Parvoviridae, Picornaviridae, Poxviridae (such as Smallpox or Vaccinia), Reoviridae (e.g., Rotavirus), Retroviridae (HTLV-I, HTLV-II, Lentivirus), and Togaviridae (e.g., Rubivirus). Viruses falling within these families can cause a variety of diseases or symptoms, including, but not limited to: arthritis, bronchiollitis, respiratory syncytial virus, encephalitis, eye infections (e.g., conjunctivitis, keratitis), chronic fatigue syndrome, hepatitis (A, B, C, E, Chronic Active, Delta), Japanese B encephalitis, Junin, Chikungunya, Rift Valley fever,

yellow fever. meningitis. opportunistic infections (e.g.. AIDS), pneumonia. Burkitt's Lymphoma. chickenpox, hemorrhagic fever, Measles. Mumps, Parainfluenza. Rabies, the common cold. Polio, leukemia, Rubella, sexually transmitted diseases, skin diseases (e.g., Kaposi's. warts), and viremia. polynucleotides or polypeptides, or agonists or antagonists of the invention. can be used to treat or detect any of these symptoms or diseases. In specific embodiments. polynucleotides, polypeptides, or agonists or antagonists of the invention are used to treat: meningitis, Dengue, EBV, and/or hepatitis (e.g., hepatitis B). In an additional specific embodiment polynucleotides, polypeptides, or agonists or antagonists of the invention are used to treat patients nonresponsive to one or more other commercially available hepatitis vaccines. In a further specific embodiment polynucleotides, polypeptides, or agonists or antagonists of the invention are used to treat AIDS.

Similarly, bacterial or fungal agents that can cause disease or symptoms and that can be treated or detected by a polynucleotide or polypeptide and/or agonist or antagonist of the present invention include, but not limited to, include, but not limited to, the following Gram-Negative and Gram-positive bacteria and bacterial families and fungi: Actinomycetales (e.g., Corynebacterium, Mycobacterium, Norcardia), Cryptococcus neoformans, Aspergillosis, Bacillaceae (e.g., Anthrax, Clostridium), Bacteroidaceae, Blastomycosis, Bordetella, Borrelia (e.g., Borrelia burgdorferi, Brucellosis, Candidiasis, Campylobacter, Coccidioidomycosis, Cryptococcosis, Dermatocycoses, E. coli (e.g., Enterotoxigenic E. coli and Enterohemorrhagic E. coli), Enterobacteriaceae (Klebsiella, Salmonella (e.g., Salmonella typhi, and Salmonella paratyphi), Serratia, Yersinia), Erysipelothrix, Helicobacter, Legionellosis. Leptospirosis, Listeria, Mycoplasmatales, Mycobacterium leprae, Vibrio cholerae, Neisseriaceae (e.g., Acinetobacter, Gonorrhea, Menigococcal), Meisseria meningitidis, Pasteurellacea Infections (e.g., Actinobacillus, Heamophilus (e.g., Heamophilus influenza type B), Pasteurella), Pseudomonas, Rickettsiaceae, Chlamydiaceae, Syphilis, Shigella spp., Staphylococcal, Meningiococcal, Pneumococcal and Streptococcal (e.g., Streptococcus pneumoniae and Group B Streptococcus). These bacterial or fungal families can cause the following diseases or symptoms, including, but not limited to: bacteremia, endocarditis. eye infections (conjunctivitis, tuberculosis, uveitis), gingivitis, opportunistic infections (e.g., AIDS related infections). paronychia. prosthesis-related infections. Reiter's Disease, respiratory tract infections, such as Whooping Cough or Empyema, sepsis, Lyme Disease, Cat-Scratch Disease, Dysentery, Paratyphoid Fever, food poisoning, Typhoid,

pneumonia, Gonorrhea. meningitis (e.g., mengitis types A and B). Chlamydia. Syphilis. Diphtheria, Leprosy. Paratuberculosis. Tuberculosis. Lupus, Botulism. gangrene, tetanus. impetigo. Rheumatic Fever, Scarlet Fever, sexually transmitted diseases, skin diseases (e.g., cellulitis. dermatocycoses), toxemia. urinary tract infections. wound infections. Polynucleotides or polypeptides, agonists or antagonists of the invention, can be used to treat or detect any of these symptoms or diseases. In specific embodiments, Ppolynucleotides, polypeptides, agonists or antagonists of the invention are used to treat: tetanus, Diptheria, botulism, and/or meningitis type B.

Moreover, parasitic agents causing disease or symptoms that can be treated or detected by a polynucleotide or polypeptide and/or agonist or antagonist of the present invention include, but not limited to, the following families or class: Amebiasis, Babesiosis, Coccidiosis, Cryptosporidiosis, Dientamoebiasis, Dourine, Ectoparasitic, Giardiasis, Helminthiasis, Leishmaniasis, Theileriasis, Toxoplasmosis, Trypanosomiasis, and Trichomonas and Sporozoans (e.g., Plasmodium virax, Plasmodium falciparium, Plasmodium malariae and Plasmodium ovale). These parasites can cause a variety of diseases or symptoms, including, but not limited to: Scabies, Trombiculiasis, eye infections, intestinal disease (e.g., dysentery, giardiasis), liver disease, lung disease, opportunistic infections (e.g., AIDS related), malaria, pregnancy complications, and toxoplasmosis. polynucleotides or polypeptides, or agonists or antagonists of the invention, can be used to treat or detect any of these symptoms or diseases.

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention of the present invention could either be by administering an effective amount of a polypeptide to the patient, or by removing cells from the patient, supplying the cells with a polynucleotide of the present invention, and returning the engineered cells to the patient (ex vivo therapy). Moreover, the polypeptide or polynucleotide of the present invention can be used as an antigen in a vaccine to raise an immune response against infectious disease.

Regeneration

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention can be used to differentiate. proliferate. and attract cells. leading to the regeneration of tissues. (See, Science 276:59-87 (1997).) The regeneration of tissues could be used to repair, replace, or protect tissue damaged by congenital defects, trauma (wounds, burns,

incisions, or ulcers). age, disease (e.g. osteoporosis, osteocarthritis, periodontal disease, liver failure), surgery, including cosmetic plastic surgery, fibrosis, reperfusion injury, or systemic cytokine damage.

Tissues that could be regenerated using the present invention include organs (e.g., pancreas, liver, intestine, kidney, skin, endothelium), muscle (smooth, skeletal or cardiac), vasculature (including vascular and lymphatics), nervous, hematopoietic, and skeletal (bone, cartilage, tendon, and ligament) tissue. Preferably, regeneration occurs without or decreased scarring. Regeneration also may include angiogenesis.

Moreover, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, may increase regeneration of tissues difficult to heal. For example, increased tendon/ligament regeneration would quicken recovery time after damage. Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention could also be used prophylactically in an effort to avoid damage. Specific diseases that could be treated include of tendinitis, carpal tunnel syndrome, and other tendon or ligament defects. A further example of tissue regeneration of non-healing wounds includes pressure ulcers, ulcers associatedwith vascular insufficiency, surgical, and traumatic wounds.

Similarly, nerve and brain tissue could also be regenerated by using polynucleotides or polypeptides, as well as agonists or antagonists of the present invention, to proliferate and differentiate nerve cells. Diseases that could be treated using this method include central and peripheral nervous system diseases, neuropathies, or mechanical and traumatic disorders (e.g., spinal cord disorders, head trauma, cerebrovascular disease, and stoke). Specifically, diseases associated with peripheral nerve injuries, peripheral neuropathy (e.g., resulting from chemotherapy or other medical therapies), localized neuropathies, and central nervous system diseases (e.g., Alzheimer's disease, Parkinson's disease, Huntington's disease, amyotrophic lateral sclerosis, and Shy-Drager syndrome), could all be treated using the polynucleotides or polypeptides, as well as agonists or antagonists of the present invention.

Chemotaxis

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention may have chemotaxis activity. A chemotaxic molecule attracts or mobilizes cells (e.g., monocytes, fibroblasts, neutrophils, T-cells, mast cells, eosinophils, epithelial and/or endothelial cells) to a particular site in the body, such as inflammation, infection, or site of

hyperproliferation. The mobilized cells can then fight off and/or heal the particular trauma or abnormality.

Polynucleotides or polypeptides, as well as agonists or antagonists of the present invention may increase chemotaxic activity of particular cells. These chemotactic molecules can then be used to treat inflammation, infection, hyperproliferative disorders, or any immune system disorder by increasing the number of cells targeted to a particular location in the body. For example, chemotaxic molecules can be used to treat wounds and other trauma to tissues by attracting immune cells to the injured location. Chemotactic molecules of the present invention can also attract fibroblasts, which can be used to treat wounds.

It is also contemplated that polynucleotides or polypeptides, as well as agonists or antagonists of the present invention may inhibit chemotactic activity. These molecules could also be used to treat disorders. Thus, polynucleotides or polypeptides, as well as agonists or antagonists of the present invention could be used as an inhibitor of chemotaxis.

Binding Activity

A polypeptide of the present invention may be used to screen for molecules that bind to the polypeptide or for molecules to which the polypeptide binds. The binding of the polypeptide and the molecule may activate (agonist), increase, inhibit (antagonist), or decrease activity of the polypeptide or the molecule bound. Examples of such molecules include antibodies, oligonucleotides, proteins (e.g., receptors),or small molecules.

Preferably, the molecule is closely related to the natural ligand of the polypeptide, e.g., a fragment of the ligand, or a natural substrate, a ligand, a structural or functional mimetic. (See, Coligan et al., Current Protocols in Immunology 1(2):Chapter 5 (1991).) Similarly, the molecule can be closely related to the natural receptor to which the polypeptide binds, or at least, a fragment of the receptor capable of being bound by the polypeptide (e.g., active site). In either case, the molecule can be rationally designed using known techniques.

Preferably, the screening for these molecules involves producing appropriate cells which express the polypeptide. Preferred cells include cells from mammals, yeast, Drosophila, or *E. coli*. Cells expressing the polypeptide (or cell membrane containing the expressed polypeptide) are then preferably contacted with a test compound potentially containing the molecule to observe binding, stimulation, or inhibition of activity of either the polypeptide or the molecule.

The assay may simply test binding of a candidate compound to the polypeptide, wherein binding is detected by a label, or in an assay involving competition with a labeled competitor. Further. the assay may test whether the candidate compound results in a signal generated by binding to the polypeptide.

Alternatively, the assay can be carried out using cell-free preparations, polypeptide/molecule affixed to a solid support, chemical libraries, or natural product mixtures. The assay may also simply comprise the steps of mixing a candidate compound with a solution containing a polypeptide, measuring polypeptide/molecule activity or binding, and comparing the polypeptide/molecule activity or binding to a standard.

Preferably, an ELISA assay can measure polypeptide level or activity in a sample (e.g., biological sample) using a monoclonal or polyclonal antibody. The antibody can measure polypeptide level or activity by either binding, directly or indirectly, to the polypeptide or by competing with the polypeptide for a substrate.

Additionally, the receptor to which the polypeptide of the present invention binds can be identified by numerous methods known to those of skill in the art, for example, ligand panning and FACS sorting (Coligan, et al., Current Protocols in Immun., 1(2), Chapter 5, (1991)). For example, expression cloning is employed wherein polyadenylated RNA is prepared from a cell responsive to the polypeptides, for example, NIH3T3 cells which are known to contain multiple receptors for the FGF family proteins, and SC-3 cells, and a cDNA library created from this RNA is divided into pools and used to transfect COS cells or other cells that are not responsive to the polypeptides. Transfected cells which are grown on glass slides are exposed to the polypeptide of the present invention, after they have been labelled. The polypeptides can be labeled by a variety of means including iodination or inclusion of a recognition site for a site-specific protein kinase.

Following fixation and incubation, the slides are subjected to auto-radiographic analysis. Positive pools are identified and sub-pools are prepared and re-transfected using an iterative sub-pooling and re-screening process, eventually yielding a single clones that encodes the putative receptor.

As an alternative approach for receptor identification, the labeled polypeptides can be photoaffinity linked with cell membrane or extract preparations that express the receptor molecule. Cross-linked material is resolved by PAGE analysis and exposed to X-ray film. The labeled complex containing the receptors of the polypeptides can be excised, resolved

into peptide fragments, and subjected to protein microsequencing. The amino acid sequence obtained from microsequencing would be used to design a set of degenerate oligonucleotide probes to screen a cDNA library to identify the genes encoding the putative receptors.

Moreover, the techniques of gene-shuffling, motif-shuffling, exon-shuffling, and/or codon-shuffling (collectively referred to as "DNA shuffling") may be employed to modulate the activities of the polypeptide of the present invention thereby effectively generating agonists and antagonists of the polypeptide of the present invention. *See generally*, U.S. Patent Nos. 5,605,793, 5,811,238, 5,830,721, 5,834,252, and 5,837,458, and Patten, P. A., *et al., Curr. Opinion Biotechnol.* 8:724-33 (1997); Harayama, S. *Trends Biotechnol.* 16(2):76-82 (1998); Hansson, L. O., *et al., J. Mol. Biol.* 287:265-76 (1999); and Lorenzo, M. M. and Blasco, R. *Biotechniques* 24(2):308-13 (1998) (each of these patents and publications are hereby incorporated by reference). In one embodiment, alteration of polynucleotides and corresponding polypeptides may be achieved by DNA shuffling. DNA shuffling involves the assembly of two or more DNA segments into a desired molecule by homologous, or site-specific, recombination. In another embodiment, polynucleotides and corresponding polypeptides may be altered by being subjected to random mutagenesis by error-prone PCR, random nucleotide insertion or other methods prior to recombination. In another embodiment, one or more components, motifs, sections, parts, domains, fragments, etc., of the polypeptide of the present invention may be recombined with one or more components, motifs, sections, parts, domains, fragments, etc. of one or more heterologous molecules. In preferred embodiments, the heterologous molecules are family members. In further preferred embodiments, the heterologous molecule is a growth factor such as, for example, platelet-derived growth factor (PDGF), insulin-like growth factor (IGF-I), transforming growth factor (TGF)-alpha, epidermal growth factor (EGF), fibroblast growth factor (FGF), TGF-beta, bone morphogenetic protein (BMP)-2, BMP-4, BMP-5, BMP-6, BMP-7, activins A and B, decapentaplegic(dpp), 60A, OP-2, dorsalin, growth differentiation factors (GDFs), nodal, MIS, inhibin-alpha, TGF-beta1, TGF-beta2, TGF-beta3, TGF-beta5, and glial-derived neurotrophic factor (GDNF).

Other preferred fragments are biologically active fragments of the polypeptide of the present invention. Biologically active fragments are those exhibiting activity similar, but not necessarily identical, to an activity of the polypeptide of the present invention. The

biological activity of the fragments may include an improved desired activity, or a decreased undesirable activity.

Additionally, this invention provides a method of screening compounds to identify those which modulate the action of the polypeptide of the present invention. An example of such an assay comprises combining a mammalian fibroblast cell, a the polypeptide of the present invention, the compound to be screened and ^{3}[H] thymidine under cell culture conditions where the fibroblast cell would normally proliferate. A control assay may be performed in the absence of the compound to be screened and compared to the amount of fibroblast proliferation in the presence of the compound to determine if the compound stimulates proliferation by determining the uptake of ^{3}[H] thymidine in each case. The amount of fibroblast cell proliferation is measured by liquid scintillation chromatography which measures the incorporation of ^{3}[H] thymidine. Both agonist and antagonist compounds may be identified by this procedure.

In another method, a mammalian cell or membrane preparation expressing a receptor for a polypeptide of the present invention is incubated with a labeled polypeptide of the present invention in the presence of the compound. The ability of the compound to enhance or block this interaction could then be measured. Alternatively, the response of a known second messenger system following interaction of a compound to be screened and the receptor is measured and the ability of the compound to bind to the receptor and elicit a second messenger response is measured to determine if the compound is a potential agonist or antagonist. Such second messenger systems include but are not limited to, cAMP guanylate cyclase, ion channels or phosphoinositide hydrolysis.

All of these above assays can be used as diagnostic or prognostic markers. The molecules discovered using these assays can be used to treat disease or to bring about a particular result in a patient (e.g., blood vessel growth) by activating or inhibiting the polypeptide/molecule. Moreover, the assays can discover agents which may inhibit or enhance the production of the polypeptides of the invention from suitably manipulated cells or tissues.

Therefore, the invention includes a method of identifying compounds which bind to a polypeptide of the invention comprising the steps of: (a) incubating a candidate binding compound with a polypeptide of the present invention; and (b) determining if binding has

occurred. Moreover, the invention includes a method of identifying agonists/antagonists comprising the steps of: (a) incubating a candidate compound with a polypeptide of the present invention, (b) assaying a biological activity, and (b) determining if a biological activity of the polypeptide has been altered.

Targeted Delivery

In another embodiment, the invention provides a method of delivering compositions to targeted cells expressing a receptor for a polypeptide of the invention, or cells expressing a cell bound form of a polypeptide of the invention.

As discussed herein, polypeptides or antibodies of the invention may be associated with heterologous polypeptides, heterologous nucleic acids, toxins, or prodrugs via hydrophobic, hydrophilic, ionic and/or covalent interactions. In one embodiment, the invention provides a method for the specific delivery of compositions of the invention to cells by administering polypeptides of the invention (including antibodies) that are associated with heterologous polypeptides or nucleic acids. In one example, the invention provides a method for delivering a therapeutic protein into the targeted cell. In another example, the invention provides a method for delivering a single stranded nucleic acid (e.g., antisense or ribozymes) or double stranded nucleic acid (e.g., DNA that can integrate into the cell's genome or replicate episomally and that can be transcribed) into the targeted cell.

In another embodiment, the invention provides a method for the specific destruction of cells (e.g., the destruction of tumor cells) by administering polypeptides of the invention (e.g., polypeptides of the invention or antibodies of the invention) in association with toxins or cytotoxic prodrugs.

By "toxin" is meant compounds that bind and activate endogenous cytotoxic effector systems, radioisotopes, holotoxins, modified toxins, catalytic subunits of toxins, or any molecules or enzymes not normally present in or on the surface of a cell that under defined conditions cause the cell's death. Toxins that may be used according to the methods of the invention include, but are not limited to, radioisotopes known in the art, compounds such as, for example, antibodies (or complement fixing containing portions thereof) that bind an inherent or induced endogenous cytotoxic effector system, thymidine kinase, endonuclease, RNAse, alpha toxin, ricin, abrin, *Pseudomonas* exotoxin A, diphtheria toxin, saporin,

momordin, gelonin. pokeweed antiviral protein. alpha-sarcin and cholera toxin. By "cytotoxic prodrug" is meant a non-toxic compound that is converted by an enzyme, normally present in the cell, into a cytotoxic compound. Cytotoxic prodrugs that may be used according to the methods of the invention include. but are not limited to, glutamyl derivatives of benzoic acid mustard alkylating agent. phosphate derivatives of etoposide or mitomycin C, cytosine arabinoside, daunorubisin. and phenoxyacetamide derivatives of doxorubicin.

<u>Drug Screening</u>

Further contemplated is the use of the polypeptides of the present invention, or the polynucleotides encoding these polypeptides, to screen for molecules which modify the activities of the polypeptides of the present invention. Such a method would include contacting the polypeptide of the present invention with a selected compound(s) suspected of having antagonist or agonist activity, and assaying the activity of these polypeptides following binding.

This invention is particularly useful for screening therapeutic compounds by using the polypeptides of the present invention, or binding fragments thereof, in any of a variety of drug screening techniques. The polypeptide or fragment employed in such a test may be affixed to a solid support, expressed on a cell surface, free in solution, or located intracellularly. One method of drug screening utilizes eukaryotic or prokaryotic host cells which are stably transformed with recombinant nucleic acids expressing the polypeptide or fragment. Drugs are screened against such transformed cells in competitive binding assays. One may measure, for example, the formulation of complexes between the agent being tested and a polypeptide of the present invention.

Thus, the present invention provides methods of screening for drugs or any other agents which affect activities mediated by the polypeptides of the present invention. These methods comprise contacting such an agent with a polypeptide of the present invention or a fragment thereof and assaying for the presence of a complex between the agent and the polypeptide or a fragment thereof, by methods well known in the art. In such a competitive binding assay, the agents to screen are typically labeled. Following incubation. free agent is separated from that present in bound form, and the amount of free or uncomplexed label is a

measure of the ability of a particular agent to bind to the polypeptides of the present invention.

Another technique for drug screening provides high throughput screening for compounds having suitable binding affinity to the polypeptides of the present invention, and is described in great detail in European Patent Application 84/03564, published on September 13, 1984, which is incorporated herein by reference herein. Briefly stated, large numbers of different small peptide test compounds are synthesized on a solid substrate, such as plastic pins or some other surface. The peptide test compounds are reacted with polypeptides of the present invention and washed. Bound polypeptides are then detected by methods well known in the art. Purified polypeptides are coated directly onto plates for use in the aforementioned drug screening techniques. In addition, non-neutralizing antibodies may be used to capture the peptide and immobilize it on the solid support.

This invention also contemplates the use of competitive drug screening assays in which neutralizing antibodies capable of binding polypeptides of the present invention specifically compete with a test compound for binding to the polypeptides or fragments thereof. In this manner, the antibodies are used to detect the presence of any peptide which shares one or more antigenic epitopes with a polypeptide of the invention.

Antisense And Ribozyme (Antagonists)

In specific embodiments, antagonists according to the present invention are nucleic acids corresponding to the sequences contained in SEQ ID NO:X, or the complementary strand thereof, and/or to nucleotide sequences contained in the cDNA contained in the related cDNA clone identified in Table 1. In one embodiment, antisense sequence is generated internally, by the organism, in another embodiment, the antisense sequence is separately administered (see, for example, O'Connor, J., Neurochem. 56:560 (1991). Oligodeoxynucleotides as Antisense Inhibitors of Gene Expression, CRC Press, Boca Raton, FL (1988). Antisense technology can be used to control gene expression through antisense DNA or RNA, or through triple-helix formation. Antisense techniques are discussed for example, in Okano, J., Neurochem. 56:560 (1991); Oligodeoxynucleotides as Antisense Inhibitors of Gene Expression, CRC Press, Boca Raton, FL (1988). Triple helix formation is discussed in, for instance, Lee et al., Nucleic Acids Research 6:3073 (1979); Cooney et al.,

Science 241:456 (1988); and Dervan et al., Science 251:1300 (1991). The methods are based on binding of a polynucleotide to a complementary DNA or RNA.

For example, the use of c-myc and c-myb antisense RNA constructs to inhibit the growth of the non-lymphocytic leukemia cell line HL-60 and other cell lines was previously described. (Wickstrom et al. (1988); Anfossi et al. (1989)). These experiments were performed in vitro by incubating cells with the oligoribonucleotide. A similar procedure for in vivo use is described in WO 91/15580. Briefly, a pair of oligonucleotides for a given antisense RNA is produced as follows: A sequence complimentary to the first 15 bases of the open reading frame is flanked by an EcoR1 site on the 5 end and a HindIII site on the 3 end. Next, the pair of oligonucleotides is heated at 90°C for one minute and then annealed in 2X ligation buffer (20mM TRIS HCl pH 7.5, 10mM MgCl2, 10MM dithiothreitol (DTT) and 0.2 mM ATP) and then ligated to the EcoR1/Hind III site of the retroviral vector PMV7 (WO 91/15580).

For example, the 5' coding portion of a polynucleotide that encodes the polypeptide of the present invention may be used to design an antisense RNA oligonucleotide of from about 10 to 40 base pairs in length. A DNA oligonucleotide is designed to be complementary to a region of the gene involved in transcription thereby preventing transcription and the production of the receptor. The antisense RNA oligonucleotide hybridizes to the mRNA in vivo and blocks translation of the mRNA molecule into receptor polypeptide.

In one embodiment, the antisense nucleic acid of the invention is produced intracellularly by transcription from an exogenous sequence. For example, a vector or a portion thereof, is transcribed, producing an antisense nucleic acid (RNA) of the invention. Such a vector would contain a sequence encoding the antisense nucleic acid. Such a vector can remain episomal or become chromosomally integrated, as long as it can be transcribed to produce the desired antisense RNA. Such vectors can be constructed by recombinant DNA technology methods standard in the art. Vectors can be plasmid, viral, or others known in the art, used for replication and expression in vertebrate cells. Expression of the sequence encoding the polypeptide of the present invnetion or fragments thereof, can be by any promoter known in the art to act in vertebrate, preferably human cells. Such promoters can be inducible or constitutive. Such promoters include, but are not limited to, the SV40 early promoter region (Bernoist and Chambon, Nature 29:304-310 (1981), the promoter contained in the 3' long terminal repeat of Rous sarcoma virus (Yamamoto et al., Cell 22:787-797

(1980), the herpes thymidine promoter (Wagner et al., Proc. Natl. Acad. Sci. U.S.A. 78:1441-1445 (1981). the regulatory sequences of the metallothionein gene (Brinster, et al., Nature 296:39-42 (1982)), etc.

The antisense nucleic acids of the invention comprise a sequence complementary to at least a portion of an RNA transcript of a gene of the present invention. However, absolute complementarity, although preferred, is not required. A sequence "complementary to at least a portion of an RNA," referred to herein, means a sequence having sufficient complementarity to be able to hybridize with the RNA, forming a stable duplex; in the case of double stranded antisense nucleic acids, a single strand of the duplex DNA may thus be tested, or triplex formation may be assayed. The ability to hybridize will depend on both the degree of complementarity and the length of the antisense nucleic acid. Generally, the larger the hybridizing nucleic acid, the more base mismatches with a RNA it may contain and still form a stable duplex (or triplex as the case may be). One skilled in the art can ascertain a tolerable degree of mismatch by use of standard procedures to determine the melting point of the hybridized complex.

Oligonucleotides that are complementary to the 5' end of the message, e.g., the 5' untranslated sequence up to and including the AUG initiation codon, should work most efficiently at inhibiting translation. However, sequences complementary to the 3' untranslated sequences of mRNAs have been shown to be effective at inhibiting translation of mRNAs as well. See generally, Wagner, R., 1994, Nature 372:333-335. Thus, oligonucleotides complementary to either the 5'- or 3'- non- translated, non-coding regions of polynucleotide sequences described herein could be used in an antisense approach to inhibit translation of endogenous mRNA. Oligonucleotides complementary to the 5' untranslated region of the mRNA should include the complement of the AUG start codon. Antisense oligonucleotides complementary to mRNA coding regions are less efficient inhibitors of translation but could be used in accordance with the invention. Whether designed to hybridize to the 5'-, 3'- or coding region of mRNA of the present invention, antisense nucleic acids should be at least six nucleotides in length, and are preferably oligonucleotides ranging from 6 to about 50 nucleotides in length. In specific aspects the oligonucleotide is at least 10 nucleotides. at least 17 nucleotides, at least 25 nucleotides or at least 50 nucleotides.

The polynucleotides of the invention can be DNA or RNA or chimeric mixtures or derivatives or modified versions thereof, single-stranded or double-stranded. The

oligonucleotide can be modified at the base moiety, sugar moiety, or phosphate backbone, for example, to improve stability of the molecule, hybridization, etc. The oligonucleotide may include other appended groups such as peptides (e.g., for targeting host cell receptors in vivo), or agents facilitating transport across the cell membrane (see, e.g., Letsinger et al., 1989, Proc. Natl. Acad. Sci. U.S.A. 86:6553-6556; Lemaitre et al., 1987, Proc. Natl. Acad. Sci. 84:648-652; PCT Publication No. WO88/09810, published December 15, 1988) or the blood-brain barrier (see, e.g., PCT Publication No. WO89/10134, published April 25, 1988), hybridization-triggered cleavage agents. (See, e.g., Krol et al., 1988, BioTechniques 6:958-976) or intercalating agents. (See, e.g., Zon, 1988, Pharm. Res. 5:539-549). To this end, the oligonucleotide may be conjugated to another molecule, e.g., a peptide, hybridization triggered cross-linking agent, transport agent, hybridization-triggered cleavage agent, etc.

The antisense oligonucleotide may comprise at least one modified base moiety which is selected from the group including, but not limited to, 5-fluorouracil, 5-bromouracil, 5-chlorouracil, 5-iodouracil, hypoxanthine, xantine, 4-acetylcytosine, 5-(carboxyhydroxylmethyl) uracil, 5-carboxymethylaminomethyl-2-thiouridine, 5-carboxymethylaminomethyluracil, dihydrouracil, beta-D-galactosylqueosine, inosine, N6-isopentenyladenine, 1-methylguanine, 1-methylinosine, 2,2-dimethylguanine, 2-methyladenine, 2-methylguanine, 3-methylcytosine, 5-methylcytosine, N6-adenine, 7-methylguanine, 5-methylaminomethyluracil, 5-methoxyaminomethyl-2-thiouracil, beta-D-mannosylqueosine, 5'-methoxycarboxymethyluracil, 5-methoxyuracil, 2-methylthio-N6-isopentenyladenine, uracil-5-oxyacetic acid (v), wybutoxosine, pseudouracil, queosine, 2-thiocytosine, 5-methyl-2-thiouracil, 2-thiouracil, 4-thiouracil, 5-methyluracil, uracil-5-oxyacetic acid methylester, uracil-5-oxyacetic acid (v), 5-methyl-2-thiouracil, 3-(3-amino-3-N-2-carboxypropyl) uracil, (acp3)w, and 2,6-diaminopurine.

The antisense oligonucleotide may also comprise at least one modified sugar moiety selected from the group including, but not limited to, arabinose, 2-fluoroarabinose, xylulose, and hexose.

In yet another embodiment, the antisense oligonucleotide comprises at least one modified phosphate backbone selected from the group including, but not limited to, a phosphorothioate, a phosphorodithioate, a phosphoramidothioate, a phosphoramidate, a phosphordiamidate, a methylphosphonate, an alkyl phosphotriester, and a formacetal or analog thereof.

In yet another embodiment, the antisense oligonucleotide is an a-anomeric oligonucleotide. An a-anomeric oligonucleotide forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual b-units, the strands run parallel to each other (Gautier et al., 1987, Nucl. Acids Res. 15:6625-6641). The oligonucleotide is a 2'-0-methylribonucleotide (Inoue et al., 1987, Nucl. Acids Res. 15:6131-6148), or a chimeric RNA-DNA analogue (Inoue et al., 1987, FEBS Lett. 215:327-330).

Polynucleotides of the invention may be synthesized by standard methods known in the art, e.g. by use of an automated DNA synthesizer (such as are commercially available from Biosearch, Applied Biosystems, etc.). As examples, phosphorothioate oligonucleotides may be synthesized by the method of Stein et al. (1988, Nucl. Acids Res. 16:3209), methylphosphonate oligonucleotides can be prepared by use of controlled pore glass polymer supports (Sarin et al., 1988, Proc. Natl. Acad. Sci. U.S.A. 85:7448-7451), etc.

While antisense nucleotides complementary to the coding region sequence could be used, those complementary to the transcribed untranslated region are most preferred.

Potential antagonists according to the invention also include catalytic RNA, or a ribozyme (See, e.g., PCT International Publication WO 90/11364, published October 4, 1990; Sarver et al, Science 247:1222-1225 (1990). While ribozymes that cleave mRNA at site specific recognition sequences can be used to destroy mRNAs, the use of hammerhead ribozymes is preferred. Hammerhead ribozymes cleave mRNAs at locations dictated by flanking regions that form complementary base pairs with the target mRNA. The sole requirement is that the target mRNA have the following sequence of two bases: 5'-UG-3'. The construction and production of hammerhead ribozymes is well known in the art and is described more fully in Haseloff and Gerlach, Nature 334:585-591 (1988). There are numerous potential hammerhead ribozyme cleavage sites within the nucleotide sequence of SEQ ID NO:X. Preferably, the ribozyme is engineered so that the cleavage recognition site is located near the 5' end of the mRNA; i.e., to increase efficiency and minimize the intracellular accumulation of non-functional mRNA transcripts.

As in the antisense approach, the ribozymes of the invention can be composed of modified oligonucleotides (e.g. for improved stability, targeting, etc.) and should be delivered to cells which express in vivo. DNA constructs encoding the ribozyme may be introduced into the cell in the same manner as described above for the introduction of antisense encoding DNA. A preferred method of delivery involves using a DNA construct "encoding" the

ribozyme under the control of a strong constitutive promoter, such as, for example, pol III or pol II promoter, so that transfected cells will produce sufficient quantities of the ribozyme to destroy endogenous messages and inhibit translation. Since ribozymes unlike antisense molecules, are catalytic, a lower intracellular concentration is required for efficiency.

Antagonist/agonist compounds may be employed to inhibit the cell growth and proliferation effects of the polypeptides of the present invention on neoplastic cells and tissues, i.e. stimulation of angiogenesis of tumors, and, therefore, retard or prevent abnormal cellular growth and proliferation, for example, in tumor formation or growth.

The antagonist/agonist may also be employed to prevent hyper-vascular diseases, and prevent the proliferation of epithelial lens cells after extracapsular cataract surgery. Prevention of the mitogenic activity of the polypeptides of the present invention may also be desirous in cases such as restenosis after balloon angioplasty.

The antagonist/agonist may also be employed to prevent the growth of scar tissue during wound healing.

The antagonist/agonist may also be employed to treat the diseases described herein.

Thus, the invention provides a method of treating disorders or diseases, including but not limited to the disorders or diseases listed throughout this application, associated with overexpression of a polynucleotide of the present invention by administering to a patient (a) an antisense molecule directed to the polynucleotide of the present invention, and/or (b) a ribozyme directed to the polynucleotide of the present invention.

__Other Activities__

A polypeptide, polynucleotide, agonist, or antagonist of the present invention, as a result of the ability to stimulate vascular endothelial cell growth, may be employed in treatment for stimulating re-vascularization of ischemic tissues due to various disease conditions such as thrombosis, arteriosclerosis, and other cardiovascular conditions. The polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be employed to stimulate angiogenesis and limb regeneration, as discussed above.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be employed for treating wounds due to injuries, burns, post-operative tissue repair, and ulcers since they are mitogenic to various cells of different origins, such as fibroblast cells

and skeletal muscle cells, and therefore, facilitate the repair or replacement of damaged or diseased tissue.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be employed stimulate neuronal growth and to treat and prevent neuronal damage which occurs in certain neuronal disorders or neuro-degenerative conditions such as Alzheimer's disease, Parkinson's disease, and AIDS-related complex. A polypeptide, polynucleotide, agonist, or antagonist of the present invention may have the ability to stimulate chondrocyte growth, therefore, they may be employed to enhance bone and periodontal regeneration and aid in tissue transplants or bone grafts.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may be also be employed to prevent skin aging due to sunburn by stimulating keratinocyte growth.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be employed for preventing hair loss, since FGF family members activate hair-forming cells and promotes melanocyte growth. Along the same lines, a polypeptide, polynucleotide, agonist, or antagonist of the present invention may be employed to stimulate growth and differentiation of hematopoietic cells and bone marrow cells when used in combination with other cytokines.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be employed to maintain organs before transplantation or for supporting cell culture of primary tissues. A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be employed for inducing tissue of mesodermal origin to differentiate in early embryos.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also increase or decrease the differentiation or proliferation of embryonic stem cells, besides, as discussed above, hematopoietic lineage.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be used to modulate mammalian characteristics. such as body height, weight, hair color, eye color, skin, percentage of adipose tissue, pigmentation, size, and shape (e.g., cosmetic surgery). Similarly, a polypeptide, polynucleotide, agonist, or antagonist of the present invention may be used to modulate mammalian metabolism affecting catabolism, anabolism, processing, utilization, and storage of energy.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may be used to change a mammal's mental state or physical state by influencing biorhythms, caricadic rhythms, depression (including depressive disorders), tendency for violence, tolerance for pain, reproductive capabilities (preferably by Activin or Inhibin-like activity), hormonal or endocrine levels, appetite, libido, memory, stress, or other cognitive qualities.

A polypeptide, polynucleotide, agonist, or antagonist of the present invention may also be used as a food additive or preservative, such as to increase or decrease storage capabilities, fat content, lipid, protein, carbohydrate, vitamins, minerals, cofactors or other nutritional components.

The above-recited applications have uses in a wide variety of hosts. Such hosts include, but are not limited to, human, murine, rabbit, goat, guinea pig, camel, horse, mouse, rat, hamster, pig, micro-pig, chicken, goat, cow, sheep, dog, cat, non-human primate, and human. In specific embodiments, the host is a mouse, rabbit, goat, guinea pig, chicken, rat, hamster, pig, sheep, dog or cat. In preferred embodiments, the host is a mammal. In most preferred embodiments, the host is a human.

Other Preferred Embodiments

Other preferred embodiments of the claimed invention include an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least about 50 contiguous nucleotides in the nucleotide sequence of SEQ ID NO:X or the complementary strand thereto, and/or the cDNA in the related cDNA clone contained in the deposit.

Also preferred is a nucleic acid molecule wherein said sequence of contiguous nucleotides is included in the nucleotide sequence of SEQ ID NO:X in the range of positions identified as "Start" and "End" in columns 7 and 8 as defined for SEQ ID NO:X in Table 1.

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least about 150 contiguous nucleotides in the nucleotide sequence of SEQ ID NO:X or the complementary strand thereto, and/or the cDNA in the related cDNA clone contained in the deposit.

Further preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least about 500 contiguous

nucleotides in the nucleotide sequence of SEQ ID NO:X or the complementary strand thereto, and/or the cDNA in the related cDNA clone contained in the deposit.

A further preferred embodiment is a nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to the nucleotide sequence of SEQ ID NO:X in the range of positions identified as "Start" and "End" in columns 7 and 8 as defined for SEQ ID NO:X in Table 1.

A further preferred embodiment is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to the complete nucleotide sequence of SEQ ID NO:X or the complementary strand thereto, and/or the cDNA in the related cDNA clone contained in the deposit.

Also preferred is an isolated nucleic acid molecule which hybridizes under stringent hybridization conditions to a nucleic acid molecule comprising a nucleotide sequence of SEQ ID NO:X or the complementary strand thereto, and/or the cDNA in the related cDNA clone contained in the deposit, wherein said nucleic acid molecule which hybridizes does not hybridize under stringent hybridization conditions to a nucleic acid molecule having a nucleotide sequence consisting of only A residues or of only T residues.

Also preferred is a composition of matter comprising a DNA molecule which comprises a cDNA clone contained in the deposit.

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least 50 contiguous nucleotides in the nucleotide sequence of the cDNA in the related cDNA clone contained in the deposit.

Also preferred is an isolated nucleic acid molecule, wherein said sequence of at least 50 contiguous nucleotides is included in the nucleotide sequence of an open reading frame sequence encoded by the cDNA in the related cDNA clone contained in the deposit.

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to sequence of at least 150 contiguous nucleotides in the nucleotide sequence encoded by the cDNA in the related cDNA clone contained in the deposit.

A further preferred embodiment is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to sequence of at least 500 contiguous nucleotides in the nucleotide sequence encoded by the cDNA in the related cDNA clone contained in the deposit.

A further preferred embodiment is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to the complete nucleotide sequence encoded by the cDNA in the related cDNA clone contained in the deposit.

A further preferred embodiment is a method for detecting in a biological sample a nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X or the complementary strand thereto; and a nucleotide sequence encoded by the cDNA in the related cDNA clone contained in the deposit; which method comprises a step of comparing a nucleotide sequence of at least one nucleic acid molecule in said sample with a sequence selected from said group and determining whether the sequence of said nucleic acid molecule in said sample is at least 95% identical to said selected sequence.

Also preferred is the above method wherein said step of comparing sequences comprises determining the extent of nucleic acid hybridization between nucleic acid molecules in said sample and a nucleic acid molecule comprising said sequence selected from said group. Similarly, also preferred is the above method wherein said step of comparing sequences is performed by comparing the nucleotide sequence determined from a nucleic acid molecule in said sample with said sequence selected from said group. The nucleic acid molecules can comprise DNA molecules or RNA molecules.

A further preferred embodiment is a method for identifying the species, tissue or cell type of a biological sample which method comprises a step of detecting nucleic acid molecules in said sample, if any, comprising a nucleotide sequence that is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X or the complementary strand thereto; and a nucleotide sequence encoded by the cDNA in the related cDNA clone contained in the deposit.

Also preferred is the above method for identifying the species, tissue or cell type of a biological sample which comprises a step of detecting nucleic acid molecules comprising a nucleotide sequence in a panel of at least two nucleotide sequences, wherein at least one sequence in said panel is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from said group.

Also preferred is a method for diagnosing in a subject a pathological condition associated with abnormal structure or expression of a nucleotide sequence of SEQ ID NO:X; or the cDNA contained in the related cDNA clone referenced in Table 1 which encodes a protein, wherein the method comprises a step of detecting in a biological sample obtained from said subject nucleic acid molecules, if any, comprising a nucleotide sequence that is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X or the complementary strand thereto; and a nucleotide sequence of the cDNA in the related cDNA clone contained in the deposit.

Also preferred is the above method for diagnosing a pathological condition which comprises a step of detecting nucleic acid molecules comprising a nucleotide sequence in a panel of at least two nucleotide sequences, wherein at least one sequence in said panel is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from said group.

Also preferred is a composition of matter comprising isolated nucleic acid molecules wherein the nucleotide sequences of said nucleic acid molecules comprise a panel of at least two nucleotide sequences, wherein at least one sequence in said panel is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X or the complementary strand thereto; and a nucleotide sequence encoded by the cDNA in the related cDNA clone contained in the deposit. The nucleic acid molecules can comprise DNA molecules or RNA molecules.

Also preferred is a composition of matter comprising isolated nucleic acid molecules wherein the nucleotide sequences of said nucleic acid molecules comprise a DNA microarray or "chip" of at least 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300, 500, 1000, 2000, 3000 or 4000 nucleotide sequences, wherein at least one sequence in said DNA microarray or "chip" is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X or the complementary strand thereto: and a nucleotide sequence encoded by the cDNA in the cDNA clone referenced in Table 1. The nucleic acid molecules can comprise DNA molecules or RNA molecules.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 90% identical to a sequence of at least about 10 contiguous amino acids in the polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and/or a polypeptide encoded by the cDNA in the related cDNA clone contained in the deposit.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 30 contiguous amino acids in the amino acid sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and/or a polypeptide encoded by the cDNA in the related cDNA clone contained in the deposit.

Further preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 100 contiguous amino acids in the amino acid sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and/or a polypeptide encoded by the cDNA in the related cDNA clone contained in the deposit.

Further preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to the complete amino acid sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and/or a polypeptide encoded by the cDNA in the related cDNA clone contained in the deposit.

Further preferred is an isolated polypeptide comprising an amino acid sequence at least 90% identical to a sequence of at least about 10 contiguous amino acids in the complete amino acid sequence of a polypeptide encoded by the cDNA clone referenced in Table 1.

Also preferred is a polypeptide wherein said sequence of contiguous amino acids is included in the amino acid sequence of a portion of said polypeptide encoded by the cDNA clone referenced in Table 1; a polypeptide encoded by SEQ ID NO:X; and/or the polypeptide sequence of SEQ ID NO:Y.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 30 contiguous amino acids in the amino acid sequence of a polypeptide encoded by the cDNA clone referenced in Table 1.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 100 contiguous amino acids in the amino acid sequence of a polypeptide encoded by the cDNA clone referenced in Table 1.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to the amino acid sequence of a polypeptide encoded by the cDNA clone referenced in Table 1.

Further preferred is an isolated antibody which binds specifically to a polypeptide comprising an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: a polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone contained in the deposit.

Further preferred is a method for detecting in a biological sample a polypeptide comprising an amino acid sequence which is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: a polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone referenced in Table 1; which method comprises a step of comparing an amino acid sequence of at least one polypeptide molecule in said sample with a sequence selected from said group and determining whether the sequence of said polypeptide molecule in said sample is at least 90% identical to said sequence of at least 10 contiguous amino acids.

Also preferred is the above method wherein said step of comparing an amino acid sequence of at least one polypeptide molecule in said sample with a sequence selected from said group comprises determining the extent of specific binding of polypeptides in said sample to an antibody which binds specifically to a polypeptide comprising an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: a polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone referenced in Table 1.

Also preferred is the above method wherein said step of comparing sequences is performed by comparing the amino acid sequence determined from a polypeptide molecule in said sample with said sequence selected from said group.

Also preferred is a method for identifying the species, tissue or cell type of a biological sample which method comprises a step of detecting polypeptide molecules in said sample, if any, comprising an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone referenced in Table 1.

Also preferred is the above method for identifying the species. tissue or cell type of a biological sample, which method comprises a step of detecting polypeptide molecules comprising an amino acid sequence in a panel of at least two amino acid sequences, wherein at least one sequence in said panel is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the above group.

Also preferred is a method for diagnosing in a subject a pathological condition associated with abnormal structure or expression of a nucleic acid sequence identified in Table 1 encoding a polypeptide, which method comprises a step of detecting in a biological sample obtained from said subject polypeptide molecules comprising an amino acid sequence in a panel of at least two amino acid sequences, wherein at least one sequence in said panel is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone referenced in Table 1.

In any of these methods, the step of detecting said polypeptide molecules includes using an antibody.

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a nucleotide sequence encoding a polypeptide wherein said polypeptide comprises an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone referenced in Table 1.

Also preferred is an isolated nucleic acid molecule, wherein said nucleotide sequence encoding a polypeptide has been optimized for expression of said polypeptide in a prokaryotic host.

Also preferred is an isolated nucleic acid molecule, wherein said polypeptide comprises an amino acid sequence selected from the group consisting of: polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone referenced in Table 1.

Further preferred is a method of making a recombinant vector comprising inserting any of the above isolated nucleic acid molecule into a vector. Also preferred is the recombinant vector produced by this method. Also preferred is a method of making a

recombinant host cell comprising introducing the vector into a host cell, as well as the recombinant host cell produced by this method.

Also preferred is a method of making an isolated polypeptide comprising culturing this recombinant host cell under conditions such that said polypeptide is expressed and recovering said polypeptide. Also preferred is this method of making an isolated polypeptide, wherein said recombinant host cell is a eukaryotic cell and said polypeptide is a human protein comprising an amino acid sequence selected from the group consisting of: polypeptide sequence of SEQ ID NO:Y; a polypeptide encoded by SEQ ID NO:X; and a polypeptide encoded by the cDNA in the related cDNA clone referenced in Table 1. The isolated polypeptide produced by this method is also preferred.

Also preferred is a method of treatment of an individual in need of an increased level of a protein activity, which method comprises administering to such an individual a Therapeutic comprising an amount of an isolated polypeptide, polynucleotide, immunogenic fragment or analogue thereof, binding agent, antibody, or antigen binding fragment of the claimed invention effective to increase the level of said protein activity in said individual.

Also preferred is a method of treatment of an individual in need of a decreased level of a protein activity, which method comprised administering to such an individual a Therapeutic comprising an amount of an isolated polypeptide, polynucleotide, immunogenic fragment or analogue thereof, binding agent, antibody, or antigen binding fragment of the claimed invention effective to decrease the level of said protein activity in said individual.

Having generally described the invention, the same will be more readily understood by reference to the following examples, which are provided by way of illustration and are not intended as limiting.

Examples

Example 1: Isolation of a Selected cDNA Clone From the Deposited Sample

Each deposited cDNA clone is contained in a plasmid vector. Table 5 identifies the vectors used to construct the cDNA library from which each clone was isolated. In many cases, the vector used to construct the library is a phage vector from which a plasmid has been excised. The following correlates the related plasmid for each phage vector used in constructing the cDNA library. For example, where a particular clone is identified in Table 5 as being isolated in the vector "Lambda Zap," the corresponding deposited clone is in "pBluescript."

Vector Used to Construct Library	Corresponding Deposited Plasmid
Lambda Zap	pBluescript (pBS)
Uni-Zap XR	pBluescript (pBS)
Zap Express	pBK
lafmid BA	plafmid BA
pSport1	pSport1
pCMVSport 2.0	pCMVSport 2.0
pCMVSport 3.0	pCMVSport 3.0
pCR®2.1	pCR®2.1

Vectors Lambda Zap (U.S. Patent Nos. 5,128,256 and 5,286,636), Uni-Zap XR (U.S. Patent Nos. 5,128, 256 and 5,286,636), Zap Express (U.S. Patent Nos. 5,128,256 and 5,286,636), pBluescript (pBS) (Short, J. M. et al., Nucleic Acids Res. 16:7583-7600 (1988); Alting-Mees, M. A. and Short, J. M., Nucleic Acids Res. 17:9494 (1989)) and pBK (Alting-Mees, M. A. et al., Strategies 5:58-61 (1992)) are commercially available from Stratagene Cloning Systems, Inc., 11011 N. Torrey Pines Road, La Jolla, CA, 92037. pBS contains an ampicillin resistance gene and pBK contains a neomycin resistance gene. Both can be transformed into E. coli strain XL-1 Blue, also available from Stratagene. pBS comes in 4 forms SK+, SK-, KS+ and KS. The S and K refers to the orientation of the polylinker to the T7 and T3 primer sequences which flank the polylinker region ("S" is for SacI and "K" is for KpnI which are the first sites on each respective end of the linker). "+" or "-" refer to the

orientation of the fl origin of replication ("ori"), such that in one orientation, single stranded rescue initiated from the fl ori generates sense strand DNA and in the other, antisense.

Vectors pSport1, pCMVSport 2.0 and pCMVSport 3.0, were obtained from Life Technologies, Inc., P. O. Box 6009, Gaithersburg, MD 20897. All Sport vectors contain an ampicillin resistance gene and may be transformed into E. coli strain DH10B, also available from Life Technologies. (See, for instance, Gruber, C. E., et al., Focus 15:59 (1993).) Vector lafmid BA (Bento Soares, Columbia University, NY) contains an ampicillin resistance gene and can be transformed into E. coli strain XL-1 Blue. Vector pCR®2.1, which is available from Invitrogen, 1600 Faraday Avenue, Carlsbad, CA 92008, contains an ampicillin resistance gene and may be transformed into E. coli strain DH10B, available from Life Technologies. (See, for instance, Clark, J. M., Nuc. Acids Res. 16:9677-9686 (1988) and Mead, D. et al., Bio/Technology 9: (1991).) Preferably, a polynucleotide of the present invention does not comprise the phage vector sequences identified for the particular clone in Table 5, as well as the corresponding plasmid vector sequences designated above.

The deposited material in the sample assigned the ATCC Deposit Number cited by reference to Table 2 and 5 for any given cDNA clone also may contain one or more additional plasmids, each comprising a cDNA clone different from that given clone. Thus, deposits sharing the same ATCC Deposit Number contain at least a plasmid for each cDNA clone referenced in Table 1.

TABLE 5

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HUKA HUKB HUKC HUKD HUKE HUKF HUKG	Human Uterine Cancer	Lambda ZAP II	LP01
HCNA HCNB	Human Colon	Lambda Zap II	LP01
HFFA	Human Fetal Brain, random primed	Lambda Zap II	LP01
HTWA	Resting T-Cell	Lambda ZAP II	LP01
HBQA	Early Stage Human Brain, random primed	Lambda ZAP II	LP01
HLMB HLMF HLMG HLMH HLMI HLMJ HLMM HLMN	breast lymph node CDNA library	Lambda ZAP II	LP01
HCQA HCQB	human colon cancer	Lamda ZAP II	LP01
HMEA HMEC HMED HMEE HMEF HMEG HMEI HMEJ HMEK HMEL	Human Microvascular Endothelial Cells, fract. A	Lambda ZAP II	LP01
HUSA HUSC	Human Umbilical Vein Endothelial Cells, fract. A	Lambda ZAP II	LP01
HLQA HLQB	Hepatocellular Tumor	Lambda ZAP II	LP01
HHGA HHGB HHGC HHGD	Hemangiopericytoma	Lambda ZAP II	LP01
HSDM	Human Striatum Depression, re-rescue	Lambda ZAP II	LP01
HUSH	H Umbilical Vein Endothelial Cells, frac A, re-excision	Lambda ZAP II	LP01
HSGS	Salivary gland, subtracted	Lambda ZAP II	LP01
HFXA HFXB HFXC HFXD HFXE HFXF HFXG HFXH	Brain frontal cortex	Lambda ZAP II	LP01
HPQA HPQB HPQC	PERM TF274	Lambda ZAP II	LP01
HFXJ HFXK	Brain Frontal Cortex, re-excision	Lambda ZAP II	LP01
HCWA HCWB HCWC HCWD HCWE HCWF HCWG HCWH HCWI HCWJ HCWK	CD34 positive cells (Cord Blood)	ZAP Express	LP02
HCUA HCUB HCUC	CD34 depleted Buffy Coat (Cord Blood)	ZAP Express	LP02
HRSM	A-14 cell line	ZAP Express	LP02
HRSA	A1-CELL LINE	ZAP Express	LP02
HCUD HCUE HCUF HCUG HCUH HCUI	CD34 depleted Buffy Coat (Cord Blood), re-excision	ZAP Express	LP02
HBXE HBXF HBXG	H. Whole Brain #2, re-excision	ZAP Express	LP02
HRLM	L8 cell line	ZAP Express	LP02
HBXA HBXB HBXC HBXD	Human Whole Brain #2 - Oligo dT > 1.5Kb	ZAP Express	LP02
HUDA HUDB HUDC	Testes	ZAP Express	LP02
HHTM HHTN HHTO	H. hypothalamus, frac A;re-excision	ZAP Express	LP02
HHTL	H. hypothalamus, frac A	ZAP Express	LP02
HASA HASD	Human Adult Spleen	Uni-ZAP XR	LP03
HFKC HFKD HFKE HFKF HFKG	Human Fetal Kidney	Uni-ZAP XR	LP03
HE8A HE8B HE8C HE8D HE8E HE8F HE8M HE8N	Human 8 Week Whole Embryo	Uni-ZAP XR	LP03
HGBA HGBD HGBE HGBF HGBG HGBH HGBI	Human Gall Bladder	Uni-ZAP XR	LP03
HLHA HLHB HLHC HLHD HLHE	Human Fetal Lung III	Uni-ZAP XR	LP03

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HLHF HLHG HLHH HLHQ			
HPMA HPMB HPMC HPMD HPME HPMF HPMG HPMH	Human Placenta	Uni-ZAP XR	LP03
HPRA HPRB HPRC HPRD	Human Prostate	Uni-ZAP XR	LP03
HSIA HSIC HSID HSIE	Human Adult Small Intestine	Uni-ZAP XR	LP03
HTEA HTEB HTEC HTED HTEE HTEF HTEG HTEH HTEI HTEJ HTEK	Human Testes	Uni-ZAP XR	LP03
HTPA HTPB HTPC HTPD HTPE	Human Pancreas Tumor	Uni-ZAP XR	LP03
HTTA HTTB HTTC HTTD HTTE HTTF	Human Testes Tumor	Uni-ZAP XR	LP03
HAPA HAPB HAPC HAPM	Human Adult Pulmonary	Uni-ZAP XR	LP03
HETA HETB HETC HETD HETE HETF HETG HETH HETI	Human Endometrial Tumor	Uni-ZAP XR	LP03
HHFB HHFC HHFD HHFE HHFF HHFG HHFH HHFI	Human Fetal Heart	Uni-ZAP XR	LP03
HHPB HHPC HHPD HHPE HHPF HHPG HHPH	Human Hippocampus	Uni-ZAP XR	LP03
HCE1 HCE2 HCE3 HCE4 HCE5 HCEB HCEC HCED HCEE HCEF HCEG	Human Cerebellum	Uni-ZAP XR	LP03
HUVB HUVC HUVD HUVE	Human Umbilical Vein, Endo. remake	Uni-ZAP XR	LP03
HSTA HSTB HSTC HSTD	Human Skin Tumor	Uni-ZAP XR	LP03
HTAA HTAB HTAC HTAD HTAE	Human Activated T-Cells	Uni-ZAP XR	LP03
HFEA HFEB HFEC	Human Fetal Epithelium (Skin)	Uni-ZAP XR	LP03
HJPA HJPB HJPC HJPD	HUMAN JURKAT MEMBRANE BOUND POLYSOMES	Uni-ZAP XR	LP03
HESA	Human epithelioid sarcoma	Uni-Zap XR	LP03
HLTA HLTB HLTC HLTD HLTE HLTF	Human T-Cell Lymphoma	Uni-ZAP XR	LP03
HFTA HFTB HFTC HFTD	Human Fetal Dura Mater	Uni-ZAP XR	LP03
HRDA HRDB HRDC HRDD HRDE HRDF	Human Rhabdomyosarcoma	Uni-ZAP XR	LP03
HCAA HCAB HCAC	Cem cells cyclohexamide treated	Uni-ZAP XR	LP03
HRGA HRGB HRGC HRGD	Raji Cells, cyclohexamide treated	Uni-ZAP XR	LP03
HSUA HSUB HSUC HSUM	Supt Cells, cyclohexamide treated	Uni-ZAP XR	LP03
HT4A HT4C HT4D	Activated T-Cells, 12 hrs.	Uni-ZAP XR	LP03
HE9A HE9B HE9C HE9D HE9E HE9F HE9G HE9H HE9M HE9N	Nine Week Old Early Stage Human	Uni-ZAP XR	LP03
HATA HATB HATC HATD HATE	Human Adrenal Gland Tumor	Uni-ZAP XR	LP03
HT5A	Activated T-Cells, 24 hrs.	Uni-ZAP XR	LP03
HFGA HFGM	Human Fetal Brain	Uni-ZAP XR	LP03
HNEA HNEB HNEC HNED HNEE	Human Neutrophil	Uni-ZAP XR	LP03
HBGB HBGD	Human Primary Breast Cancer	Uni-ZAP XR	LP03
HBNA HBNB	Human Normal Breast	Uni-ZAP XR	LP03
HCAS	Cem Cells, cyclohexamide treated, subtra	Uni-ZAP XR	LP03
HHPS	Human Hippocampus, subtracted	pBS	LP03
HKCS HKCU	Human Colon Cancer, subtracted	pBS	LP03

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HRGS	Raji cells. cyclohexamide treated. subtracted	pBS	LP03
HSUT	Supt cells. cyclohexamide treated. differentially expressed	pBS	LP03
HT4S	Activated T-Cells. 12 hrs. subtracted	Uni-ZAP XR	LP03
HCDA HCDB HCDC HCDD HCDE	Human Chondrosarcoma	Uni-ZAP XR	LP03
HOAA HOAB HOAC	Human Osteosarcoma	Uni-ZAP XR	LP03
HTLA HTLB HTLC HTLD HTLE HTLF	Human adult testis. large inserts	Uni-ZAP XR	LP03
HLMA HLMC HLMD	Breast Lymph node cDNA library	Uni-ZAP XR	LP03
H6EA H6EB H6EC	HL-60. PMA 4H	Uni-ZAP XR	LP03
HTXA HTXB HTXC HTXD HTXE HTXF HTXG HTXH	Activated T-Cell (12hs)/Thiouridine labelledEco	Uni-ZAP XR	LP03
HNFA HNFB HNFC HNFD HNFE HNFF HNFG HNFH HNFJ	Human Neutrophil. Activated	Uni-ZAP XR	LP03
HTOB HTOC	HUMAN TONSILS. FRACTION 2	Uni-ZAP XR	LP03
HMGB	Human OB MG63 control fraction I	Uni-ZAP XR	LP03
HOPB	Human OB HOS control fraction I	Uni-ZAP XR	LP03
HORB	Human OB HOS treated (10 nM E2) fraction I	Uni-ZAP XR	LP03
HSVA HSVB HSVC	Human Chronic Synovitis	Uni-ZAP XR	LP03
HROA	HUMAN STOMACH	Uni-ZAP XR	LP03
HBJA HBJB HBJC HBJD HBJE HBJF HBJG HBJH HBJI HBJJ HBJK	HUMAN B CELL LYMPHOMA	Uni-ZAP XR	LP03
HCRA HCRB HCRC	human corpus colosum	Uni-ZAP XR	LP03
HODA HODB HODC HODD	human ovarian cancer	Uni-ZAP XR	LP03
HDSA	Dermatofibrosarcoma Protuberance	Uni-ZAP XR	LP03
HMWA HMWB HMWC HMWD HMWE HMWF HMWG HMWH HMWI HMWJ	Bone Marrow Cell Line (RS4;11)	Uni-ZAP XR	LP03
HSOA	stomach cancer (human)	Uni-ZAP XR	LP03
HERA	SKIN	Uni-ZAP XR	LP03
HMDA	Brain-medulloblastoma	Uni-ZAP XR	LP03
HGLA HGLB HGLD	Glioblastoma	Uni-ZAP XR	LP03
HEAA	H. Atrophic Endometrium	Uni-ZAP XR	LP03
HBCA HBCB	H. Lymph node breast Cancer	Uni-ZAP XR	LP03
HPWT	Human Prostate BPH. re-excision	Uni-ZAP XR	LP03
HFVG HFVH HFVI	Fetal Liver. subtraction II	pBS	LP03
HNFI	Human Neutrophils, Activated. re-excision	pBS	LP03
HBMB HBMC HBMD	Human Bone Marrow. re-excision	pBS	LP03
HKML HKMM HKMN	H. Kidney Medulla. re-excision	pBS	LP03
HKIX HKIY	H. Kidney Cortex. subtracted	pBS	LP03
HADT	H. Amygdala Depression. subtracted	pBS	LP03
H6AS	Hl-60. untreated. subtracted	Uni-ZAP XR	LP03
H6ES	HL-60. PMA 4H. subtracted	Uni-ZAP XR	LP03
H6BS	HL-60. RA 4h. Subtracted	Uni-ZAP XR	LP03

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
H6CS	HL-60. PMA 1d. subtracted	Uni-ZAP XR	LP03
HTXJ HTXK	Activated T-cell(12h)/Thiouridine-re-excision	Uni-ZAP XR	LP03
HMSA HMSB HMSC HMSD HMSE HMSF HMSG HMSH HMSI HMSJ HMSK	Monocyte activated	Uni-ZAP XR	LP03
HAGA HAGB HAGC HAGD HAGE HAGF	Human Amygdala	Uni-ZAP XR	LP03
HSRA HSRB HSRE	STROMAL -OSTEOCLASTOMA	Uni-ZAP XR	LP03
HSRD HSRF HSRG HSRH	Human Osteoclastoma Stromal Cells - unamplified	Uni-ZAP XR	LP03
HSQA HSQB HSQC HSQD HSQE HSQF HSQG	Stromal cell TF274	Uni-ZAP XR	LP03
HSKA HSKB HSKC HSKD HSKE HSKF HSKZ	Smooth muscle. serum treated	Uni-ZAP XR	LP03
HSLA HSLB HSLC HSLD HSLE HSLF HSLG	Smooth muscle.control	Uni-ZAP XR	LP03
HSDA HSDD HSDE HSDF HSDG HSDH	Spinal cord	Uni-ZAP XR	LP03
HPWS	Prostate-BPH subtracted II	pBS	LP03
HSKW HSKX HSKY	Smooth Muscle- HASTE normalized	pBS	LP03
HFPB HFPC HFPD	H. Frontal cortex.epileptic:re-excision	Uni-ZAP XR	LP03
HSDI HSDJ HSDK	Spinal Cord. re-excision	Uni-ZAP XR	LP03
HSKN HSKO	Smooth Muscle Serum Treated. Norm	pBS	LP03
HSKG HSKH HSKI	Smooth muscle. serum induced.re-exc	pBS	LP03
HFCA HFCB HFCC HFCD HFCE HFCF	Human Fetal Brain	Uni-ZAP XR	LP04
HPTA HPTB HPTD	Human Pituitary	Uni-ZAP XR	LP04
HTHB HTHC HTHD	Human Thymus	Uni-ZAP XR	LP04
HE6B HE6C HE6D HE6E HE6F HE6G HE6S	Human Whole Six Week Old Embryo	Uni-ZAP XR	LP04
HSSA HSSB HSSC HSSD HSSE HSSF HSSG HSSH HSSI HSSJ HSSK	Human Synovial Sarcoma	Uni-ZAP XR	LP04
HE7T	7 Week Old Early Stage Human. subtracted	Uni-ZAP XR	LP04
HEPA HEPB HEPC	Human Epididymus	Uni-ZAP XR	LP04
HSNA HSNB HSNC HSNM HSNN	Human Synovium	Uni-ZAP XR	LP04
HPFB HPFC HPFD HPFE	Human Prostate Cancer. Stage C fraction	Uni-ZAP XR	LP04
HE2A HE2D HE2E HE2H HE2I HE2M HE2N HE2O	12 Week Old Early Stage Human	Uni-ZAP XR	LP04
HE2B HE2C HE2F HE2G HE2P HE2Q	12 Week Old Early Stage Human. II	Uni-ZAP XR	LP04
HPTS HPTT HPTU	Human Pituitary. subtracted	Uni-ZAP XR	LP04
HAUA HAUB HAUC	Amniotic Cells - TNF induced	Uni-ZAP XR	LP04
HAQA HAQB HAQC HAQD	Amniotic Cells - Primary Culture	Uni-ZAP XR	LP04
HWTA HWTB HWTC	wilm's tumor	Uni-ZAP XR	LP04
HBSD	Bone Cancer. re-excision	Uni-ZAP XR	LP04
HSGB	Salivary gland. re-excision	Uni-ZAP XR	LP04
HSJA HSJB HSJC	Smooth muscle-ILb induced	Uni-ZAP XR	LP04
HSXA HSXB HSXC HSXD	Human Substantia Nigra	Uni-ZAP XR	LP04

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HSHA HSHB HSHC	Smooth muscle, IL1b induced	Uni-ZAP XR	LP04
HOUA HOUB HOUC HOUD HOUE	Adipocytes	Uni-ZAP XR	LP04
HPWA HPWB HPWC HPWD HPWE	Prostate BPH	Uni-ZAP XR	LP04
HELA HELB HELC HELD HELE HELF HELG HELH	Endothelial cells-control	Uni-ZAP XR	LP04
HEMA HEMB HEMC HEMD HEME HEMF HEMG HEMH	Endothelial-induced	Uni-ZAP XR	LP04
HBIA HBIB HBIC	Human Brain, Striatum	Uni-ZAP XR	LP04
HHSA HHSB HHSC HHSD HHSE	Human Hypothalmus,Schizophrenia	Uni-ZAP XR	LP04
HNGA HNGB HNGC HNGD HNGE HNGF HNGG HNGH HNGI HNGJ	neutrophils control	Uni-ZAP XR	LP04
HNHA HNHB HNHC HNHD HNHE HNHF HNHG HNHH HNHI HNHJ	Neutrophils IL-1 and LPS induced	Uni-ZAP XR	LP04
HSDB HSDC	STRIATUM DEPRESSION	Uni-ZAP XR	LP04
HHPT	Hypothalamus	Uni-ZAP XR	LP04
HSAT HSAU HSAV HSAW HSAX HSAY HSAZ	Anergic T-cell	Uni-ZAP XR	LP04
HBMS HBMT HBMU HBMV HBMW HBMX	Bone marrow	Uni-ZAP XR	LP04
HOEA HOEB HOEC HOED HOEE HOEF HOEJ	Osteoblasts	Uni-ZAP XR	LP04
HAIA HAIB HAIC HAID HAIE HAIF	Epithelial-TNFa and INF induced	Uni-ZAP XR	LP04
HTGA HTGB HTGC HTGD	Apoptotic T-cell	Uni-ZAP XR	LP04
HMCA HMCB HMCC HMCD HMCE	Macrophage-oxLDL	Uni-ZAP XR	LP04
HMAA HMAB HMAC HMAD HMAE HMAF HMAG	Macrophage (GM-CSF treated)	Uni-ZAP XR	LP04
HPHA	Normal Prostate	Uni-ZAP XR	LP04
HPIA HPIB HPIC	LNCAP prostate cell line	Uni-ZAP XR	LP04
HPJA HPJB HPJC	PC3 Prostate cell line	Uni-ZAP XR	LP04
HOSE HOSF HOSG	Human Osteoclastoma, re-excision	Uni-ZAP XR	LP04
HTGE HTGF	Apoptotic T-cell, re-excision	Uni-ZAP XR	LP04
HMAJ HMAK	H Macrophage (GM-CSF treated), re-excision	Uni-ZAP XR	LP04
HACB HACC HACD	Human Adipose Tissue, re-excision	Uni-ZAP XR	LP04
HFPA	H. Frontal Cortex, Epileptic	Uni-ZAP XR	LP04
HFAA HFAB HFAC HFAD HFAE	Alzheimers, spongy change	Uni-ZAP XR	LP04
HFAM	Frontal Lobe, Dementia	Uni-ZAP XR	LP04
HMIA HMIB HMIC	Human Manic Depression Tissue	Uni-ZAP XR	LP04
HTSA HTSE HTSF HTSG HTSH	Human Thymus	pBS	LP05
HPBA HPBB HPBC HPBD HPBE	Human Pineal Gland	pBS	LP05
HSAA HSAB HSAC	HSA 172 Cells	pBS	LP05
HSBA HSBB HSBC HSBM	HSC172 cells	pBS	LP05
HJAA HJAB HJAC HJAD	Jurkat T-cell G1 phase	pBS	LP05
HJBA HJBB HJBC HJBD	Jurkat T-Cell, S phase	pBS	LP05
HAFA HAFB	Aorta endothelial cells + TNF-a	pBS	LP05
HAWA HAWB HAWC	Human White Adipose	pBS	LP05
HTNA HTNB	Human Thyroid	pBS	LP05

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HONA	Normal Ovary. Premenopausal	pBS	LP05
HARA HARB	Human Adult Retina	pBS	LP05
HLJA HLJB	Human Lung	pCMVSport 1	LP06
HOFM HOFN HOFO	H. Ovarian Tumor. II. OV5232	pCMVSport 2.0	LP07
HOGA HOGB HOGC	OV 10-3-95	pCMVSport 2.0	LP07
HCGL	CD34+cells. II	pCMVSport 2.0	LP07
HDLA	Hodgkin's Lymphoma I	pCMVSport 2.0	LP07
HDTA HDTB HDTC HDTD HDTE	Hodgkin's Lymphoma II	pCMVSport 2.0	LP07
HKAA HKAB HKAC HKAD HKAE HKAF HKAG HKAH	Keratinocyte	pCMVSport2.0	LP07
HCIM	CAPFINDER. Crohn's Disease. lib 2	pCMVSport 2.0	LP07
HKAL	Keratinocyte. lib 2	pCMVSport2.0	LP07
HKAT	Keratinocyte. lib 3	pCMVSport2.0	LP07
HNDA	Nasal polyps	pCMVSport2.0	LP07
HDRA	H. Primary Dendritic Cells.lib 3	pCMVSport2.0	LP07
HOHA HOHB HOHC	Human Osteoblasts II	pCMVSport2.0	LP07
HLDA HLDB HLDC	Liver. Hepatoma	pCMVSport3.0	LP08
HLDN HLDO HLDP	Human Liver. normal	pCMVSport3.0	LP08
HMTA	pBMC stimulated w/ poly I/C	pCMVSport3.0	LP08
HNTA	NTERA2. control	pCMVSport3.0	LP08
HDPA HDPB HDPC HDPD HDPF HDPG HDPH HDPI HDPJ HDPK	Primary Dendritic Cells, lib 1	pCMVSport3.0	LP08
HDPM HDPN HDPO HDPP	Primary Dendritic cells.frac 2	pCMVSport3.0	LP08
HMUA HMUB HMUC	Myoloid Progenitor Cell Line	pCMVSport3.0	LP08
HHEA HHEB HHEC HHED	T Cell helper I	pCMVSport3.0	LP08
HHEM HHEN HHEO HHEP	T cell helper II	pCMVSport3.0	LP08
HEQA HEQB HEQC	Human endometrial stromal cells	pCMVSport3.0	LP08
HJMA HJMB	Human endometrial stromal cells-treated with progesterone	pCMVSport3.0	LP08
HSWA HSWB HSWC	Human endometrial stromal cells-treated with estradiol	pCMVSport3.0	LP08
HSYA HSYB HSYC	Human Thymus Stromal Cells	pCMVSport3.0	LP08
HLWA HLWB HLWC	Human Placenta	pCMVSport3.0	LP08
HRAA HRAB HRAC	Rejected Kidney. lib 4	pCMVSport3.0	LP08
HMTM	PCR. pBMC I/C treated	PCRII	LP09
HMJA	H. Meniingima. M6	pSport 1	LP10
HMKA HMKB HMKC HMKD HMKE	H. Meningima, M1	pSport 1	LP10
HUSG HUSI	Human umbilical vein endothelial cells, IL-4 induced	pSport 1	LP10
HUSX HUSY	Human Umbilical Vein Endothelial Cells. uninduced	pSport 1	LP10
HOFA	Ovarian Tumor I, OV5232	pSport 1	LP10
HCFA HCFB HCFC HCFD	T-Cell PHA 16 hrs	pSport 1	LP10
HCFL HCFM HCFN HCFO	T-Cell PHA 24 hrs	pSport 1	LP10
HADA HADC HADD HADE HADF HADG	Human Adipose	pSport 1	LP10

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HOVA HOVB HOVC	Human Ovary	pSport 1	LP10
HTWB HTWC HTWD HTWE HTWF	Resting T-Cell Library.II	pSport 1	LP10
HMMA	Spleen metastic melanoma	pSport 1	LP10
HLYA HLYB HLYC HLYD HLYE	Spleen. Chronic lymphocytic leukemia	pSport 1	LP10
HCGA	CD34+ cell. I	pSport 1	LP10
HEOM HEON	Human Eosinophils	pSport 1	LP10
HTDA	Human Tonsil. Lib 3	pSport 1	LP10
HSPA	Salivary Gland. Lib 2	pSport 1	LP10
HCHA HCHB HCHC	Breast Cancer cell line. MDA 36	pSport 1	LP10
HCHM HCHN	Breast Cancer Cell line. angiogenic	pSport 1	LP10
HCIA	Crohn's Disease	pSport 1	LP10
HDAA HDAB HDAC	HEL cell line	pSport 1	LP10
HABA	Human Astrocyte	pSport 1	LP10
HUFA HUFB HUFC	Ulcerative Colitis	pSport 1	LP10
HNTM	NTERA2 + retinoic acid. 14 days	pSport 1	LP10
HDQA	Primary Dendritic cells.CapFinder2. frac 1	pSport 1	LP10
HDQM	Primary Dendritic Cells. CapFinder. frac 2	pSport 1	LP10
HLDX	Human Liver. normal.CapFinder	pSport 1	LP10
HULA HULB HULC	Human Dermal Endothelial Cells.untreated	pSport1	LP10
HUMA	Human Dermal Endothelial cells.treated	pSport1	LP10
HCJA	Human Stromal Endometrial fibroblasts. untreated	pSport1	LP10
HCJM	Human Stromal endometrial fibroblasts. treated w/ estradiol	pSport1	LP10
HEDA	Human Stromal endometrial fibroblasts. treated with progesterone	pSport1	LP10
HFNA	Human ovary tumor cell OV350721	pSport1	LP10
HKGA HKGB HKGC HKGD	Merkel Cells	pSport1	LP10
HISA HISB HISC	Pancreas Islet Cell Tumor	pSport1	LP10
HLSA	Skin. burned	pSport1	LP10
HBZA	Prostate.BPH. Lib 2	pSport 1	LP10
HBZS	Prostate BPH.Lib 2. subtracted	pSport 1	LP10
HFIA HFIB HFIC	Synovial Fibroblasts (control)	pSport 1	LP10
HFIH HFII HFIJ	Synovial hypoxia	pSport 1	LP10
HFIT HFIU HFIV	Synovial IL-1/TNF stimulated	pSport 1	LP10
HGCA	Messangial cell. frac 1	pSport1	LP10
HMVA HMVB HMVC	Bone Marrow Stromal Cell. untreated	pSport1	LP10
HFIX HFIY HFIZ	Synovial Fibroblasts (Il1/TNF). subt	pSport1	LP10
HFOX HFOY HFOZ	Synovial hypoxia-RSF subtracted	pSport1	LP10
HMQA HMQB HMQC HMQD	Human Activated Monocytes	Uni-ZAP XR	LP11
HLIA HLIB HLIC	Human Liver	pCMVSport 1	LP012
HHBA HHBB HHBC HHBD HHBE	Human Heart	pCMVSport 1	LP012
HBBA HBBB	Human Brain	pCMVSport 1	LP012

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HLJA HLJB HLJC HLJD HLJE	Human Lung	pCMVSport 1	LP012
HOGA HOGB HOGC	Ovarian Tumor	pCMVSport 2.0	LP012
HTJM	Human Tonsils, Lib 2	pCMVSport 2.0	LP012
HAMF HAMG	KMH2	pCMVSport 3.0	LP012
HAJA HAJB HAJC	L428	pCMVSport 3.0	LP012
HWBA HWBB HWBC HWBD HWBE	Dendritic cells, pooled	pCMVSport 3.0	LP012
HWAA HWAB HWAC HWAD HWAE	Human Bone Marrow, treated	pCMVSport 3.0	LP012
HYAA HYAB HYAC	B Cell lymphoma	pCMVSport 3.0	LP012
HWHG HWHH HWHI	Healing groin wound, 6.5 hours post incision	pCMVSport 3.0	LP012
HWHP HWHQ HWHR	Healing groin wound: 7.5 hours post incision	pCMVSport 3.0	LP012
HARM	Healing groin wound - zero hr post-incision (control)	pCMVSport 3.0	LP012
HBIM	Olfactory epithelium: nasalcavity	pCMVSport 3.0	LP012
HWDA	Healing Abdomen wound: 70&90 min post incision	pCMVSport 3.0	LP012
HWEA	Healing Abdomen Wound:15 days post incision	pCMVSport 3.0	LP012
HWJA	Healing Abdomen Wound:21&29 days	pCMVSport 3.0	LP012
HNAL	Human Tongue, frac 2	pSport1	LP012
HMJA	H. Meniingima, M6	pSport1	LP012
HMKA HMKB HMKC HMKD HMKE	H. Meningima, M1	pSport1	LP012
HOFA	Ovarian Tumor I, OV5232	pSport1	LP012
HCFA HCFB HCFC HCFD	T-Cell PHA 16 hrs	pSport1	LP012
HCFL HCFM HCFN HCFO	T-Cell PHA 24 hrs	pSport1	LP012
HMMA HMMB HMMC	Spleen metastic melanoma	pSport1	LP012
HTDA	Human Tonsil, Lib 3	pSport1	LP012
HDBA	Human Fetal Thymus	pSport1	LP012
HDUA	Pericardium	pSport1	LP012
HBZA	Prostate,BPH, Lib 2	pSport1	LP012
HWCA	Larynx tumor	pSport1	LP012
HWKA	Normal lung	pSport1	LP012
HSMB	Bone marrow stroma,treated	pSport1	LP012
HBHM	Normal trachea	pSport1	LP012
HLFC	Human Larynx	pSport1	LP012
HLRB	Siebben Polyposis	pSport1	LP012
HNIA	Mammary Gland	pSport1	LP012
HNJB	Palate carcinoma	pSport1	LP012
HNKA	Palate normal	pSport1	LP012
HMZA	Pharynx carcinoma	pSport1	LP012
HABG	Cheek Carcinoma	pSport1	LP012
HMZM	Pharynx Carcinoma	pSport1	LP012
HDRM	Larynx Carcinoma	pSport1	LP012
HVAA	Pancreas normal PCA4 No	pSport1	LP012
HICA	Tongue carcinoma	pSport1	LP012

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HUKA HUKB HUKC HUKD HUKE	Human Uterine Cancer	Lambda ZAP II	LP013
HFFA	Human Fetal Brain. random primed	Lambda ZAP II	LP013
HTUA	Activated T-cell labeled with 4-thioluri	Lambda ZAP II	LP013
HBQA	Early Stage Human Brain. random primed	Lambda ZAP II	LP013
HMEB	Human microvascular Endothelial cells. fract. B	Lambda ZAP II	LP013
HUSH	Human Umbilical Vein Endothelial cells. fract. A. re-excision	Lambda ZAP II	LP013
HLQC HLQD	Hepatocellular tumor. re-excision	Lambda ZAP II	LP013
HTWJ HTWK HTWL	Resting T-cell. re-excision	Lambda ZAP II	LP013
HF6S	Human Whole 6 week Old Embryo (II). subt	pBluescript	LP013
HHPS	Human Hippocampus. subtracted	pBluescript	LP013
HL1S	LNCAP. differential expression	pBluescript	LP013
HLHS HLHT	Early Stage Human Lung. Subtracted	pBluescript	LP013
HSUS	Supt cells. cyclohexamide treated. subtracted	pBluescript	LP013
HSUT	Supt cells. cyclohexamide treated. differentially expressed	pBluescript	LP013
HSDS	H. Striatum Depression. subtracted	pBluescript	LP013
HPTZ	Human Pituitary. Subtracted VII	pBluescript	LP013
HSDX	H. Striatum Depression. subt II	pBluescript	LP013
HSDZ	H. Striatum Depression. subt	pBluescript	LP013
HPBA HPBB HPBC HPBD HPBE	Human Pineal Gland	pBluescript SK-	LP013
HRTA	Colorectal Tumor	pBluescript SK-	LP013
HSBA HSBB HSBC HSBM	HSC172 cells	pBluescript SK-	LP013
HJAA HJAB HJAC HJAD	Jurkat T-cell G1 phase	pBluescript SK-	LP013
HJBA HJBB HJBC HJBD	Jurkat T-cell. S1 phase	pBluescript SK-	LP013
HTNA HTNB	Human Thyroid	pBluescript SK-	LP013
HAHA HAHB	Human Adult Heart	Uni-ZAP XR	LP013
HE6A	Whole 6 week Old Embryo	Uni-ZAP XR	LP013
HFCA HFCB HFCC HFCD HFCE	Human Fetal Brain	Uni-ZAP XR	LP013
HFKC HFKD HFKE HFKF HFKG	Human Fetal Kidney	Uni-ZAP XR	LP013
HGBA HGBD HGBE HGBF HGBG	Human Gall Bladder	Uni-ZAP XR	LP013
HPRA HPRB HPRC HPRD	Human Prostate	Uni-ZAP XR	LP013
HTEA HTEB HTEC HTED HTEE	Human Testes	Uni-ZAP XR	LP013
HTTA HTTB HTTC HTTD HTTE	Human Testes Tumor	Uni-ZAP XR	LP013
HYBA HYBB	Human Fetal Bone	Uni-ZAP XR	LP013
HFLA	Human Fetal Liver	Uni-ZAP XR	LP013
HHFB HHFC HHFD HHFE HHFF	Human Fetal Heart	Uni-ZAP XR	LP013
HUVB HUVC HUVD HUVE	Human Umbilical Vein. End. remake	Uni-ZAP XR	LP013
HTHB HTHC HTHD	Human Thymus	Uni-ZAP XR	LP013
HSTA HSTB HSTC HSTD	Human Skin Tumor	Uni-ZAP XR	LP013
HTAA HTAB HTAC HTAD HTAE	Human Activated T-cells	Uni-ZAP XR	LP013
HFEA HFEB HFEC	Human Fetal Epithelium (skin)	Uni-ZAP XR	LP013
HJPA HJPB HJPC HJPD	Human Jurkat Membrane Bound Polysomes	Uni-ZAP XR	LP013
HESA	Human Epithelioid Sarcoma	Uni-ZAP XR	LP013

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HALS	Human Adult Liver, Subtracted	Uni-ZAP XR	LP013
HFTA HFTB HFTC HFTD	Human Fetal Dura Mater	Uni-ZAP XR	LP013
HCAA HCAB HCAC	Cem cells, cyclohexamide treated	Uni-ZAP XR	LP013
HRGA HRGB HRGC HRGD	Raji Cells, cyclohexamide treated	Uni-ZAP XR	LP013
HE9A HE9B HE9C HE9D HE9E	Nine Week Old Early Stage Human	Uni-ZAP XR	LP013
HSFA	Human Fibrosarcoma	Uni-ZAP XR	LP013
HATA HATB HATC HATD HATE	Human Adrenal Gland Tumor	Uni-ZAP XR	LP013
HTRA	Human Trachea Tumor	Uni-ZAP XR	LP013
HE2A HE2D HE2E HE2H HE2I	12 Week Old Early Stage Human	Uni-ZAP XR	LP013
HE2B HE2C HE2F HE2G HE2P	12 Week Old Early Stage Human, II	Uni-ZAP XR	LP013
HNEA HNEB HNEC HNED HNEE	Human Neutrophil	Uni-ZAP XR	LP013
HBGA	Human Primary Breast Cancer	Uni-ZAP XR	LP013
HPTS HPTT HPTU	Human Pituitary, subtracted	Uni-ZAP XR	LP013
HMQA HMQB HMQC HMQD	Human Activated Monocytes	Uni-ZAP XR	LP013
HOAA HOAB HOAC	Human Osteosarcoma	Uni-ZAP XR	LP013
HTOA HTOD HTOE HTOF HTOG	human tonsils	Uni-ZAP XR	LP013
HMGB	Human OB MG63 control fraction I	Uni-ZAP XR	LP013
HOPB	Human OB HOS control fraction I	Uni-ZAP XR	LP013
HOQB	Human OB HOS treated (1 nM E2) fraction I	Uni-ZAP XR	LP013
HAUA HAUB HAUC	Amniotic Cells - TNF induced	Uni-ZAP XR	LP013
HAQA HAQB HAQC HAQD	Amniotic Cells - Primary Culture	Uni-ZAP XR	LP013
HROA HROC	HUMAN STOMACH	Uni-ZAP XR	LP013
HBJA HBJB HBJC HBJD HBJE	HUMAN B CELL LYMPHOMA	Uni-ZAP XR	LP013
HODA HODB HODC HODD	human ovarian cancer	Uni-ZAP XR	LP013
HCPA	Corpus Callosum	Uni-ZAP XR	LP013
HSOA	stomach cancer (human)	Uni-ZAP XR	LP013
HERA	SKIN	Uni-ZAP XR	LP013
HMDA	Brain-medulloblastoma	Uni-ZAP XR	LP013
HGLA HGLB HGLD	Glioblastoma	Uni-ZAP XR	LP013
HWTA HWTB HWTC	wilm's tumor	Uni-ZAP XR	LP013
HEAA	H. Atrophic Endometrium	Uni-ZAP XR	LP013
HAPN HAPO HAPP HAPQ HAPR	Human Adult Pulmonary;re-excision	Uni-ZAP XR	LP013
HLTG HLTH	Human T-cell lymphoma;re-excision	Uni-ZAP XR	LP013
HAHC HAHD HAHE	Human Adult Heart;re-excision	Uni-ZAP XR	LP013
HAGA HAGB HAGC HAGD HAGE	Human Amygdala	Uni-ZAP XR	LP013
HSJA HSJB HSJC	Smooth muscle-ILb induced	Uni-ZAP XR	LP013
HSHA HSHB HSHC	Smooth muscle, IL1b induced	Uni-ZAP XR	LP013
HPWA HPWB HPWC HPWD HPWE	Prostate BPH	Uni-ZAP XR	LP013
HPIA HPIB HPIC	LNCAP prostate cell line	Uni-ZAP XR	LP013
HPJA HPJB HPJC	PC3 Prostate cell line	Uni-ZAP XR	LP013
HBTA	Bone Marrow Stroma, TNF&LPS ind	Uni-ZAP XR	LP013
HMCF HMCG HMCH HMCI HMCJ	Macrophage-oxLDL; re-excision	Uni-ZAP XR	LP013
HAGG HAGH HAGI	Human Amygdala;re-excision	Uni-ZAP XR	LP013
HACA	H. Adipose Tissue	Uni-ZAP XR	LP013
HKFB	K562 + PMA (36 hrs),re-excision	ZAP Express	LP013
HCWT HCWU HCWV	CD34 positive cells (cord blood),re-ex	ZAP Express	LP013

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HBWA	Whole brain	ZAP Express	LP013
HBXA HBXB HBXC HBXD	Human Whole Brain #2 - Oligo dT > 1.5Kb	ZAP Express	LP013
HAVM	Temporal cortex-Alzheizmer	pT-Adv	LP014
HAVT	Hippocampus, Alzheimer Subtracted	pT-Adv	LP014
HHAS	CHME Cell Line	Uni-ZAP XR	LP014
HAJR	Larynx normal	pSport 1	LP014
HWLE HWLF HWLG HWLH	Colon Normal	pSport 1	LP014
HCRM HCRN HCRO	Colon Carcinoma	pSport 1	LP014
HWLI HWLJ HWLK	Colon Normal	pSport 1	LP014
HWLQ HWLR HWLS HWLT	Colon Tumor	pSport 1	LP014
HBFM	Gastrocnemius Muscle	pSport 1	LP014
HBOD HBOE	Quadriceps Muscle	pSport 1	LP014
HBKD HBKE	Soleus Muscle	pSport 1	LP014
HCCM	Pancreatic Langerhans	pSport 1	LP014
HWGA	Larynx carcinoma	pSport 1	LP014
HWGM HWGN	Larynx carcinoma	pSport 1	LP014
HWLA HWLB HWLC	Normal colon	pSport 1	LP014
HWLM HWLN	Colon Tumor	pSport 1	LP014
HVAM HVAN HVAO	Pancreas Tumor	pSport 1	LP014
HWGQ	Larynx carcinoma	pSport 1	LP014
HAQM HAQN	Salivary Gland	pSport 1	LP014
HASM	Stomach; normal	pSport 1	LP014
HBCM	Uterus; normal	pSport 1	LP014
HCDM	Testis; normal	pSport 1	LP014
HDJM	Brain; normal	pSport 1	LP014
HEFM	Adrenal Gland,normal	pSport 1	LP014
HBAA	Rectum normal	pSport 1	LP014
HFDM	Rectum tumour	pSport 1	LP014
HGAM	Colon, normal	pSport 1	LP014
HHMM	Colon, tumour	pSport 1	LP014
HCLB HCLC	Human Lung Cancer	Lambda Zap II	LP015
HRLA	L1 Cell line	ZAP Express	LP015
HHAM	Hypothalamus, Alzheimer's	pCMVSport 3.0	LP015
HKBA	Ku 812F Basophils Line	pSport 1	LP015
HS2S	Saos2, Dexamethosome Treated	pSport 1	LP016
HA5A	Lung Carcinoma A549 TNFalpha activated	pSport 1	LP016
HTFM	TF-1 Cell Line GM-CSF Treated	pSport 1	LP016
HYAS	Thyroid Tumour	pSport 1	LP016
HUTS	Larynx Normal	pSport 1	LP016
HXOA	Larynx Tumor	pSport 1	LP016
HEAH	Ea.hy.926 cell line	pSport 1	LP016
HINA	Adenocarcinoma Human	pSport 1	LP016
HRMA	Lung Mesothelium	pSport 1	LP016
HLCL	Human Pre-Differentiated Adipocytes	Uni-Zap XR	LP017
HS2A	Saos2 Cells	pSport 1	LP020

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HS21	Saos2 Cells: Vitamin D3 Treated	pSport 1	LP020
HUCM	CHME Cell Line, untreated	pSport 1	LP020
HEPN	Aryepiglottis Normal	pSport 1	LP020
HPSN	Sinus Piniformis Tumour	pSport 1	LP020
HNSA	Stomach Normal	pSport 1	LP020
HNSM	Stomach Tumour	pSport 1	LP020
HNLA	Liver Normal Met5No	pSport 1	LP020
HUTA	Liver Tumour Met 5 Tu	pSport 1	LP020
HOCN	Colon Normal	pSport 1	LP020
HOCT	Colon Tumor	pSport 1	LP020
HTNT	Tongue Tumour	pSport 1	LP020
HLXN	Larynx Normal	pSport 1	LP020
HLXT	Larynx Tumour	pSport 1	LP020
HTYN	Thymus	pSport 1	LP020
HPLN	Placenta	pSport 1	LP020
HTNG	Tongue Normal	pSport 1	LP020
HZAA	Thyroid Normal (SDCA2 No)	pSport 1	LP020
HWES	Thyroid Thyroiditis	pSport 1	LP020
HFHD	Ficolled Human Stromal Cells, 5Fu treated	pTrip1Ex2	LP021
HFHM.HFHN	Ficolled Human Stromal Cells, Untreated	pTrip1Ex2	LP021
HPCI	Hep G2 Cells, lambda library	lambda Zap-CMV XR	LP021
HBCA,HBCB,HBCC	H. Lymph node breast Cancer	Uni-ZAP XR	LP021
HCOK	Chondrocytes	pSPORT1	LP022
HDCA, HDCB, HDCC	Dendritic Cells From CD34 Cells	pSPORT1	LP022
HDMA, HDMB	CD40 activated monocyte dendritic cells	pSPORT1	LP022
HDDM, HDDN, HDDO	LPS activated derived dendritic cells	pSPORT1	LP022
HPCR	Hep G2 Cells, PCR library	lambda Zap-CMV XR	LP022
HAAA, HAAB, HAAC	Lung, Cancer (4005313A3): Invasive Poorly Differentiated Lung Adenocarcinoma	pSPORT1	LP022
HIPA, HIPB, HIPC	Lung, Cancer (4005163 B7): Invasive, Poorly Diff. Adenocarcinoma, Metastatic	pSPORT1	LP022
HOOH, HOOI	Ovary, Cancer: (4004562 B6) Papillary Serous Cystic Neoplasm, Low Malignant Pot	pSPORT1	LP022
HIDA	Lung, Normal: (4005313 B1)	pSPORT1	LP022
HUJA,HUJB,HUJC,HUJD,HUJE	B-Cells	pCMVSport 3.0	LP022
HNOA,HNOB,HNOC,HNOD	Ovary, Normal: (9805C040R)	pSPORT1	LP022
HNLM	Lung, Normal: (4005313 B1)	pSPORT1	LP022
HSCL	Stromal Cells	pSPORT1	LP022
HAAX	Lung, Cancer: (4005313 A3) Invasive Poorly-differentiated Metastatic lung adenocarcinoma	pSPORT1	LP022
HUUA,HUUB,HUUC,HUUD	B-cells (unstimulated)	pTrip1Ex2	LP022
HWWA,HWWB,HWWC,HWWD,HWWE,HWWF,HWWG	B-cells (stimulated)	pSPORT1	LP022
HCCC	Colon, Cancer: (9808C064R)	pCMVSport 3.0	LP023

Libraries owned by Catalog	Catalog Description	Vector	ATCC Deposit
HPDO HPDP HPDQ HPDR HPD	Ovary. Cancer (9809C332): Poorly differentiated adenocarcinoma	pSport 1	LP023
HPCO HPCP HPCQ HPCT	Ovary, Cancer (15395A1F): Grade II Papillary Carcinoma	pSport 1	LP023
HOCM HOCO HOCP HOCQ	Ovary, Cancer: (15799A1F) Poorly differentiated carcinoma	pSport 1	LP023
HCBM HCBN HCBO	Breast, Cancer: (4004943 A5)	pSport 1	LP023
HNBT HNBU HNBV	Breast. Normal: (4005522B2)	pSport 1	LP023
HBCP HBCQ	Breast, Cancer: (4005522 A2)	pSport 1	LP023
HBCJ	Breast, Cancer: (9806C012R)	pSport 1	LP023
HSAM HSAN	Stromal cells 3.88	pSport 1	LP023
HVCA HVCB HVCC HVCD	Ovary, Cancer: (4004332 A2)	pSport 1	LP023
HSCK HSEN HSEO	Stromal cells (HBM3.18)	pSport 1	LP023
HSCP HSCQ	stromal cell clone 2.5	pSport 1	LP023
HUXA	Breast Cancer: (4005385 A2)	pSport 1	LP023
HCOM HCON HCOO HCOP HCOQ	Ovary, Cancer (4004650 A3): Well-Differentiated Micropapillary Serous Carcinoma	pSport 1	LP023
HBNM	Breast, Cancer: (9802C020E)	pSport 1	LP023
HVVA HVVB HVVC HVVD HVVE	Human Bone Marrow, treated	pSport 1	LP023

Two approaches can be used to isolate a particular clone from the deposited sample of plasmid DNAs cited for that clone in Table 5. First, a plasmid is directly isolated by screening the clones using a polynucleotide probe corresponding to the nucleotide sequence of SEQ ID NO:X.

Particularly, a specific polynucleotide with 30-40 nucleotides is synthesized using an Applied Biosystems DNA synthesizer according to the sequence reported. The oligonucleotide is labeled, for instance, with ^{32}P-γ-ATP using T4 polynucleotide kinase and purified according to routine methods. (E.g., Maniatis et al., Molecular Cloning: A Laboratory Manual. Cold Spring Harbor Press, Cold Spring, NY (1982).) The plasmid mixture is transformed into a suitable host, as indicated above (such as XL-1 Blue (Stratagene)) using techniques known to those of skill in the art, such as those provided by the vector supplier or in related publications or patents cited above. The transformants are plated on 1.5% agar plates (containing the appropriate selection agent, e.g., ampicillin) to a density of about 150 transformants (colonies) per plate. These plates are screened using Nylon membranes according to routine methods for bacterial colony screening (e.g., Sambrook et al., Molecular Cloning: A Laboratory Manual, 2nd Edit., (1989), Cold Spring Harbor Laboratory Press, pages 1.93 to 1.104), or other techniques known to those of skill in the art.

Alternatively, two primers of 17-20 nucleotides derived from both ends of the nucleotide sequence of SEQ ID NO:X are synthesized and used to amplify the desired cDNA using the deposited cDNA plasmid as a template. The polymerase chain reaction is carried out under routine conditions, for instance, in 25 µl of reaction mixture with 0.5 ug of the above cDNA template. A convenient reaction mixture is 1.5-5 mM $MgCl_2$, 0.01% (w/v) gelatin, 20 µM each of dATP, dCTP, dGTP, dTTP, 25 pmol of each primer and 0.25 Unit of Taq polymerase. Thirty five cycles of PCR (denaturation at 94°C for 1 min; annealing at 55°C for 1 min; elongation at 72°C for 1 min) are performed with a Perkin-Elmer Cetus automated thermal cycler. The amplified product is analyzed by agarose gel electrophoresis and the DNA band with expected molecular weight is excised and purified. The PCR product is verified to be the selected sequence by subcloning and sequencing the DNA product.

Several methods are available for the identification of the 5' or 3' non-coding portions of a gene which may not be present in the deposited clone. These methods include but are not

limited to, filter probing, clone enrichment using specific probes, and protocols similar or identical to 5' and 3' "RACE" protocols which are well known in the art. For instance, a method similar to 5' RACE is available for generating the missing 5' end of a desired full-length transcript. (Fromont-Racine et al., Nucleic Acids Res. 21(7):1683-1684 (1993).)

Briefly, a specific RNA oligonucleotide is ligated to the 5' ends of a population of RNA presumably containing full-length gene RNA transcripts. A primer set containing a primer specific to the ligated RNA oligonucleotide and a primer specific to a known sequence of the gene of interest is used to PCR amplify the 5' portion of the desired full-length gene. This amplified product may then be sequenced and used to generate the full length gene.

This above method starts with total RNA isolated from the desired source, although poly-A+ RNA can be used. The RNA preparation can then be treated with phosphatase if necessary to eliminate 5' phosphate groups on degraded or damaged RNA which may interfere with the later RNA ligase step. The phosphatase should then be inactivated and the RNA treated with tobacco acid pyrophosphatase in order to remove the cap structure present at the 5' ends of messenger RNAs. This reaction leaves a 5' phosphate group at the 5' end of the cap cleaved RNA which can then be ligated to an RNA oligonucleotide using T4 RNA ligase.

This modified RNA preparation is used as a template for first strand cDNA synthesis using a gene specific oligonucleotide. The first strand synthesis reaction is used as a template for PCR amplification of the desired 5' end using a primer specific to the ligated RNA oligonucleotide and a primer specific to the known sequence of the gene of interest. The resultant product is then sequenced and analyzed to confirm that the 5' end sequence belongs to the desired gene.

Example 2: Isolation of Genomic Clones Corresponding to a Polynucleotide

A human genomic P1 library (Genomic Systems, Inc.) is screened by PCR using primers selected for the sequence corresponding to SEQ ID NO:X, according to the method described in Example 1. (See also, Sambrook.)

Example 3: Tissue specific expression analysis

The Human Genome Sciences, Inc. (HGS) database is derived from sequencing tissue specific cDNA libraries. Libraries generated from a particular tissue are selected and the specific tissue expression pattern of EST groups or assembled contigs within these libraries is determined by comparison of the expression patterns of those groups or contigs within the entire database. ESTs which show tissue specific expression are selected.

The original clone from which the specific EST sequence was generated, is obtained from the catalogued library of clones and the insert amplified by PCR using methods known in the art. The PCR product is denatured then transferred in 96 well format to a nylon membrane (Schleicher and Scheull) generating an array filter of tissue specific clones. Housekeeping genes, maize genes, and known tissue specific genes are included on the filters. These targets can be used in signal normalization and to validate assay sensitivity. Additional targets are included to monitor probe length and specificity of hybridization.

Radioactively labeled hybridization probes are generated by first strand cDNA synthesis per the manufacturer's instructions (Life Technologies) from mRNA/RNA samples prepared from the specific tissue being analyzed. The hybridization probes are purified by gel exclusion chromatography, quantitated, and hybridized with the array filters in hybridization bottles at 65°C overnight. The filters are washed under stringent conditions and signals are captured using a Fuji phosphorimager.

Data is extracted using AIS software and following background subtraction, signal normalization is performed. This includes a normalization of filter-wide expression levels between different experimental runs. Genes that are differentially expressed in the tissue of interest are identified and the full length sequence of these clones is generated.

Example 4: Chromosomal Mapping of the Polynucleotides

An oligonucleotide primer set is designed according to the sequence at the 5' end of SEQ ID NO:X. This primer preferably spans about 100 nucleotides. This primer set is then used in a polymerase chain reaction under the following set of conditions : 30 seconds, 95°C; 1 minute, 56°C; 1 minute, 70°C. This cycle is repeated 32 times followed by one 5 minute

cycle at 70°C. Human. mouse. and hamster DNA is used as template in addition to a somatic cell hybrid panel containing individual chromosomes or chromosome fragments (Bios, Inc). The reactions is analyzed on either 8% polyacrylamide gels or 3.5 % agarose gels. Chromosome mapping is determined by the presence of an approximately 100 bp PCR fragment in the particular somatic cell hybrid.

Example 5: Bacterial Expression of a Polypeptide

A polynucleotide encoding a polypeptide of the present invention is amplified using PCR oligonucleotide primers corresponding to the 5' and 3' ends of the DNA sequence, as outlined in Example 1, to synthesize insertion fragments. The primers used to amplify the cDNA insert should preferably contain restriction sites. such as BamHI and XbaI, at the 5' end of the primers in order to clone the amplified product into the expression vector. For example, BamHI and XbaI correspond to the restriction enzyme sites on the bacterial expression vector pQE-9. (Qiagen, Inc., Chatsworth, CA). This plasmid vector encodes antibiotic resistance (Amp^r), a bacterial origin of replication (ori), an IPTG-regulatable promoter/operator (P/O), a ribosome binding site (RBS), a 6-histidine tag (6-His), and restriction enzyme cloning sites.

The pQE-9 vector is digested with BamHI and XbaI and the amplified fragment is ligated into the pQE-9 vector maintaining the reading frame initiated at the bacterial RBS. The ligation mixture is then used to transform the E. coli strain M15/rep4 (Qiagen, Inc.) which contains multiple copies of the plasmid pREP4, which expresses the lacI repressor and also confers kanamycin resistance (Kan^r). Transformants are identified by their ability to grow on LB plates and ampicillin/kanamycin resistant colonies are selected. Plasmid DNA is isolated and confirmed by restriction analysis.

Clones containing the desired constructs are grown overnight (O/N) in liquid culture in LB media supplemented with both Amp (100 ug/ml) and Kan (25 ug/ml). The O/N culture is used to inoculate a large culture at a ratio of 1:100 to 1:250. The cells are grown to an optical density 600 ($O.D.^{600}$) of between 0.4 and 0.6. IPTG (Isopropyl-B-D-thiogalacto pyranoside) is then added to a final concentration of 1 mM. IPTG induces by inactivating the lacI repressor. clearing the P/O leading to increased gene expression.

Cells are grown for an extra 3 to 4 hours. Cells are then harvested by centrifugation (20 mins at 6000Xg). The cell pellet is solubilized in the chaotropic agent 6 Molar Guanidine HCl by stirring for 3-4 hours at 4°C. The cell debris is removed by centrifugation, and the supernatant containing the polypeptide is loaded onto a nickel-nitrilo-tri-acetic acid ("Ni-NTA") affinity resin column (available from QIAGEN, Inc., *supra*). Proteins with a 6 x His tag bind to the Ni-NTA resin with high affinity and can be purified in a simple one-step procedure (for details see: The QIAexpressionist (1995) QIAGEN, Inc., *supra*).

Briefly, the supernatant is loaded onto the column in 6 M guanidine-HCl, pH 8, the column is first washed with 10 volumes of 6 M guanidine-HCl, pH 8, then washed with 10 volumes of 6 M guanidine-HCl pH 6, and finally the polypeptide is eluted with 6 M guanidine-HCl, pH 5.

The purified protein is then renatured by dialyzing it against phosphate-buffered saline (PBS) or 50 mM Na-acetate, pH 6 buffer plus 200 mM NaCl. Alternatively, the protein can be successfully refolded while immobilized on the Ni-NTA column. The recommended conditions are as follows: renature using a linear 6M-1M urea gradient in 500 mM NaCl, 20% glycerol, 20 mM Tris/HCl pH 7.4, containing protease inhibitors. The renaturation should be performed over a period of 1.5 hours or more. After renaturation the proteins are eluted by the addition of 250 mM immidazole. Immidazole is removed by a final dialyzing step against PBS or 50 mM sodium acetate pH 6 buffer plus 200 mM NaCl. The purified protein is stored at 4° C or frozen at -80° C.

In addition to the above expression vector, the present invention further includes an expression vector comprising phage operator and promoter elements operatively linked to a polynucleotide of the present invention, called pHE4a. (ATCC Accession Number 209645, deposited on February 25, 1998.) This vector contains: 1) a neomycinphosphotransferase gene as a selection marker, 2) an E. coli origin of replication, 3) a T5 phage promoter sequence, 4) two lac operator sequences, 5) a Shine-Delgarno sequence, and 6) the lactose operon repressor gene (lacIq). The origin of replication (oriC) is derived from pUC19 (LTI, Gaithersburg, MD). The promoter sequence and operator sequences are made synthetically.

DNA can be inserted into the pHEa by restricting the vector with NdeI and XbaI, BamHI, XhoI, or Asp718, running the restricted product on a gel, and isolating the larger fragment (the stuffer fragment should be about 310 base pairs). The DNA insert is generated according to the PCR protocol described in Example 1, using PCR primers having restriction

sites for NdeI (5' primer) and XbaI, BamHI, XhoI, or Asp718 (3' primer). The PCR insert is gel purified and restricted with compatible enzymes. The insert and vector are ligated according to standard protocols.

The engineered vector could easily be substituted in the above protocol to express protein in a bacterial system.

Example 6: Purification of a Polypeptide from an Inclusion Body

The following alternative method can be used to purify a polypeptide expressed in *E coli* when it is present in the form of inclusion bodies. Unless otherwise specified, all of the following steps are conducted at 4-10°C.

Upon completion of the production phase of the *E. coli* fermentation, the cell culture is cooled to 4-10°C and the cells harvested by continuous centrifugation at 15,000 rpm (Heraeus Sepatech). On the basis of the expected yield of protein per unit weight of cell paste and the amount of purified protein required, an appropriate amount of cell paste, by weight, is suspended in a buffer solution containing 100 mM Tris, 50 mM EDTA, pH 7.4. The cells are dispersed to a homogeneous suspension using a high shear mixer.

The cells are then lysed by passing the solution through a microfluidizer (Microfuidics, Corp. or APV Gaulin, Inc.) twice at 4000-6000 psi. The homogenate is then mixed with NaCl solution to a final concentration of 0.5 M NaCl, followed by centrifugation at 7000 xg for 15 min. The resultant pellet is washed again using 0.5M NaCl, 100 mM Tris, 50 mM EDTA, pH 7.4.

The resulting washed inclusion bodies are solubilized with 1.5 M guanidine hydrochloride (GuHCl) for 2-4 hours. After 7000 xg centrifugation for 15 min., the pellet is discarded and the polypeptide containing supernatant is incubated at 4°C overnight to allow further GuHCl extraction.

Following high speed centrifugation (30,000 xg) to remove insoluble particles, the GuHCl solubilized protein is refolded by quickly mixing the GuHCl extract with 20 volumes of buffer containing 50 mM sodium, pH 4.5, 150 mM NaCl, 2 mM EDTA by vigorous stirring. The refolded diluted protein solution is kept at 4°C without mixing for 12 hours prior to further purification steps.

To clarify the refolded polypeptide solution, a previously prepared tangential filtration unit equipped with 0.16 μm membrane filter with appropriate surface area (e.g., Filtron), equilibrated with 40 mM sodium acetate, pH 6.0 is employed. The filtered sample is loaded onto a cation exchange resin (e.g., Poros HS-50, Perseptive Biosystems). The column is washed with 40 mM sodium acetate, pH 6.0 and eluted with 250 mM, 500 mM, 1000 mM, and 1500 mM NaCl in the same buffer, in a stepwise manner. The absorbance at 280 nm of the effluent is continuously monitored. Fractions are collected and further analyzed by SDS-PAGE.

Fractions containing the polypeptide are then pooled and mixed with 4 volumes of water. The diluted sample is then loaded onto a previously prepared set of tandem columns of strong anion (Poros HQ-50, Perseptive Biosystems) and weak anion (Poros CM-20, Perseptive Biosystems) exchange resins. The columns are equilibrated with 40 mM sodium acetate, pH 6.0. Both columns are washed with 40 mM sodium acetate, pH 6.0, 200 mM NaCl. The CM-20 column is then eluted using a 10 column volume linear gradient ranging from 0.2 M NaCl, 50 mM sodium acetate, pH 6.0 to 1.0 M NaCl, 50 mM sodium acetate, pH 6.5. Fractions are collected under constant A_{280} monitoring of the effluent. Fractions containing the polypeptide (determined, for instance, by 16% SDS-PAGE) are then pooled.

The resultant polypeptide should exhibit greater than 95% purity after the above refolding and purification steps. No major contaminant bands should be observed from Commassie blue stained 16% SDS-PAGE gel when 5 μg of purified protein is loaded. The purified protein can also be tested for endotoxin/LPS contamination, and typically the LPS content is less than 0.1 ng/ml according to LAL assays.

Example 7: Cloning and Expression of a Polypeptide in a Baculovirus Expression System

In this example, the plasmid shuttle vector pA2 is used to insert a polynucleotide into a baculovirus to express a polypeptide. This expression vector contains the strong polyhedrin promoter of the *Autographa californica* nuclear polyhedrosis virus (AcMNPV) followed by convenient restriction sites such as BamHI, Xba I and Asp718. The polyadenylation site of the simian virus 40 ("SV40") is used for efficient polyadenylation. For easy selection of recombinant virus, the plasmid contains the beta-galactosidase gene from *E. coli* under control of a weak Drosophila promoter in the same orientation, followed by the

polyadenylation signal of the polyhedrin gene. The inserted genes are flanked on both sides by viral sequences for cell-mediated homologous recombination with wild-type viral DNA to generate a viable virus that express the cloned polynucleotide.

Many other baculovirus vectors can be used in place of the vector above, such as pAc373, pVL941, and pAcIM1, as one skilled in the art would readily appreciate, as long as the construct provides appropriately located signals for transcription, translation, secretion and the like, including a signal peptide and an in-frame AUG as required. Such vectors are described, for instance, in Luckow et al., Virology 170:31-39 (1989).

Specifically, the cDNA sequence contained in the deposited clone, including the AUG initiation codon, is amplified using the PCR protocol described in Example 1. If a naturally occurring signal sequence is used to produce the polypeptide of the present invention, the pA2 vector does not need a second signal peptide. Alternatively, the vector can be modified (pA2 GP) to include a baculovirus leader sequence, using the standard methods described in Summers et al., "A Manual of Methods for Baculovirus Vectors and Insect Cell Culture Procedures," Texas Agricultural Experimental Station Bulletin No. 1555 (1987).

The amplified fragment is isolated from a 1% agarose gel using a commercially available kit ("Geneclean," BIO 101 Inc., La Jolla, Ca.). The fragment then is digested with appropriate restriction enzymes and again purified on a 1% agarose gel.

The plasmid is digested with the corresponding restriction enzymes and optionally, can be dephosphorylated using calf intestinal phosphatase, using routine procedures known in the art. The DNA is then isolated from a 1% agarose gel using a commercially available kit ("Geneclean" BIO 101 Inc., La Jolla, Ca.).

The fragment and the dephosphorylated plasmid are ligated together with T4 DNA ligase. *E. coli* HB101 or other suitable *E. coli* hosts such as XL-1 Blue (Stratagene Cloning Systems, La Jolla, CA) cells are transformed with the ligation mixture and spread on culture plates. Bacteria containing the plasmid are identified by digesting DNA from individual colonies and analyzing the digestion product by gel electrophoresis. The sequence of the cloned fragment is confirmed by DNA sequencing.

Five µg of a plasmid containing the polynucleotide is co-transfected with 1.0 µg of a commercially available linearized baculovirus DNA ("BaculoGold™ baculovirus DNA", Pharmingen, San Diego, CA), using the lipofection method described by Felgner et al., Proc.

Natl. Acad. Sci. USA 84:7413-7417 (1987). One μg of BaculoGold™ virus DNA and 5 μg of the plasmid are mixed in a sterile well of a microtiter plate containing 50 μl of serum-free Grace's medium (Life Technologies Inc., Gaithersburg, MD). Afterwards, 10 μl Lipofectin plus 90 μl Grace's medium are added, mixed and incubated for 15 minutes at room temperature. Then the transfection mixture is added drop-wise to Sf9 insect cells (ATCC CRL 1711) seeded in a 35 mm tissue culture plate with 1 ml Grace's medium without serum. The plate is then incubated for 5 hours at 27° C. The transfection solution is then removed from the plate and 1 ml of Grace's insect medium supplemented with 10% fetal calf serum is added. Cultivation is then continued at 27° C for four days.

After four days the supernatant is collected and a plaque assay is performed, as described by Summers and Smith, *supra*. An agarose gel with "Blue Gal" (Life Technologies Inc., Gaithersburg) is used to allow easy identification and isolation of gal-expressing clones, which produce blue-stained plaques. (A detailed description of a "plaque assay" of this type can also be found in the user's guide for insect cell culture and baculovirology distributed by Life Technologies Inc., Gaithersburg, page 9-10.) After appropriate incubation, blue stained plaques are picked with the tip of a micropipettor (e.g., Eppendorf). The agar containing the recombinant viruses is then resuspended in a microcentrifuge tube containing 200 μl of Grace's medium and the suspension containing the recombinant baculovirus is used to infect Sf9 cells seeded in 35 mm dishes. Four days later the supernatants of these culture dishes are harvested and then they are stored at 4° C.

To verify the expression of the polypeptide, Sf9 cells are grown in Grace's medium supplemented with 10% heat-inactivated FBS. The cells are infected with the recombinant baculovirus containing the polynucleotide at a multiplicity of infection ("MOI") of about 2. If radiolabeled proteins are desired, 6 hours later the medium is removed and is replaced with SF900 II medium minus methionine and cysteine (available from Life Technologies Inc., Rockville, MD). After 42 hours, 5 μCi of ^{35}S-methionine and 5 μCi ^{35}S-cysteine (available from Amersham) are added. The cells are further incubated for 16 hours and then are harvested by centrifugation. The proteins in the supernatant as well as the intracellular proteins are analyzed by SDS-PAGE followed by autoradiography (if radiolabeled).

Microsequencing of the amino acid sequence of the amino terminus of purified protein may be used to determine the amino terminal sequence of the produced protein.

Example 8: Expression of a Polypeptide in Mammalian Cells

The polypeptide of the present invention can be expressed in a mammalian cell. A typical mammalian expression vector contains a promoter element, which mediates the initiation of transcription of mRNA, a protein coding sequence, and signals required for the termination of transcription and polyadenylation of the transcript. Additional elements include enhancers, Kozak sequences and intervening sequences flanked by donor and acceptor sites for RNA splicing. Highly efficient transcription is achieved with the early and late promoters from SV40, the long terminal repeats (LTRs) from Retroviruses, e.g., RSV, HTLVI, HIVI and the early promoter of the cytomegalovirus (CMV). However, cellular elements can also be used (e.g., the human actin promoter).

Suitable expression vectors for use in practicing the present invention include, for example, vectors such as pSVL and pMSG (Pharmacia, Uppsala, Sweden), pRSVcat (ATCC 37152), pSV2dhfr (ATCC 37146), pBC12MI (ATCC 67109), pCMVSport 2.0, and pCMVSport 3.0. Mammalian host cells that could be used include, human Hela, 293, H9 and Jurkat cells, mouse NIH3T3 and C127 cells, Cos 1, Cos 7 and CV1, quail QC1-3 cells, mouse L cells and Chinese hamster ovary (CHO) cells.

Alternatively, the polypeptide can be expressed in stable cell lines containing the polynucleotide integrated into a chromosome. The co-transfection with a selectable marker such as DHFR, gpt, neomycin, hygromycin allows the identification and isolation of the transfected cells.

The transfected gene can also be amplified to express large amounts of the encoded protein. The DHFR (dihydrofolate reductase) marker is useful in developing cell lines that carry several hundred or even several thousand copies of the gene of interest. (See, e.g., Alt, F. W., et al., J. Biol. Chem. 253:1357-1370 (1978); Hamlin, J. L. and Ma, C., Biochem. et Biophys. Acta, 1097:107-143 (1990); Page, M. J. and Sydenham, M. A., Biotechnology 9:64-68 (1991).) Another useful selection marker is the enzyme glutamine synthase (GS) (Murphy et al., Biochem J. 227:277-279 (1991); Bebbington et al., Bio/Technology 10:169-175 (1992). Using these markers, the mammalian cells are grown in selective medium and the cells with the highest resistance are selected. These cell lines contain the amplified gene(s) integrated into a chromosome. Chinese hamster ovary (CHO) and NSO cells are often used for the production of proteins.

Derivatives of the plasmid pSV2-dhfr (ATCC Accession No. 37146), the expression vectors pC4 (ATCC Accession No. 209646) and pC6 (ATCC Accession No.209647) contain the strong promoter (LTR) of the Rous Sarcoma Virus (Cullen et al., Molecular and Cellular Biology, 438-447 (March, 1985)) plus a fragment of the CMV-enhancer (Boshart et al., Cell 41:521-530 (1985).) Multiple cloning sites, e.g., with the restriction enzyme cleavage sites BamHI, XbaI and Asp718, facilitate the cloning of the gene of interest. The vectors also contain the 3' intron, the polyadenylation and termination signal of the rat preproinsulin gene, and the mouse DHFR gene under control of the SV40 early promoter.

Specifically, the plasmid pC6, for example, is digested with appropriate restriction enzymes and then dephosphorylated using calf intestinal phosphates by procedures known in the art. The vector is then isolated from a 1% agarose gel.

A polynucleotide of the present invention is amplified according to the protocol outlined in Example 1. If a naturally occurring signal sequence is used to produce the polypeptide of the present invention, the vector does not need a second signal peptide. Alternatively, if a naturally occurring signal sequence is not used, the vector can be modified to include a heterologous signal sequence. (See, e.g., WO 96/34891.)

The amplified fragment is isolated from a 1% agarose gel using a commercially available kit ("Geneclean," BIO 101 Inc., La Jolla, Ca.). The fragment then is digested with appropriate restriction enzymes and again purified on a 1% agarose gel.

The amplified fragment is then digested with the same restriction enzyme and purified on a 1% agarose gel. The isolated fragment and the dephosphorylated vector are then ligated with T4 DNA ligase. *E. coli* HB101 or XL-1 Blue cells are then transformed and bacteria are identified that contain the fragment inserted into plasmid pC6 using, for instance, restriction enzyme analysis.

Chinese hamster ovary cells lacking an active DHFR gene is used for transfection. Five µg of the expression plasmid pC6 or pC4 is cotransfected with 0.5 µg of the plasmid pSVneo using lipofectin (Felgner et al., *supra*). The plasmid pSV2-neo contains a dominant selectable marker, the *neo* gene from Tn5 encoding an enzyme that confers resistance to a group of antibiotics including G418. The cells are seeded in alpha minus MEM supplemented with 1 mg/ml G418. After 2 days, the cells are trypsinized and seeded in hybridoma cloning plates (Greiner, Germany) in alpha minus MEM supplemented with 10, 25, or 50 ng/ml of metothrexate plus 1 mg/ml G418. After about 10-14 days single clones

are trypsinized and then seeded in 6-well petri dishes or 10 ml flasks using different concentrations of methotrexate (50 nM. 100 nM, 200 nM, 400 nM, 800 nM). Clones growing at the highest concentrations of methotrexate are then transferred to new 6-well plates containing even higher concentrations of methotrexate (1 μM, 2 μM, 5 μM, 10 mM, 20 mM). The same procedure is repeated until clones are obtained which grow at a concentration of 100 - 200 μM. Expression of the desired gene product is analyzed, for instance, by SDS-PAGE and Western blot or by reversed phase HPLC analysis.

Example 9: Protein Fusions

The polypeptides of the present invention are preferably fused to other proteins. These fusion proteins can be used for a variety of applications. For example, fusion of the present polypeptides to His-tag, HA-tag, protein A, IgG domains, and maltose binding protein facilitates purification. (See Example 5; see also EP A 394,827; Traunecker, et al., Nature 331:84-86 (1988).) Similarly, fusion to IgG-1, IgG-3, and albumin increases the halflife time in vivo. Nuclear localization signals fused to the polypeptides of the present invention can target the protein to a specific subcellular localization, while covalent heterodimer or homodimers can increase or decrease the activity of a fusion protein. Fusion proteins can also create chimeric molecules having more than one function. Finally, fusion proteins can increase solubility and/or stability of the fused protein compared to the non-fused protein. All of the types of fusion proteins described above can be made by modifying the following protocol, which outlines the fusion of a polypeptide to an IgG molecule, or the protocol described in Example 5.

Briefly, the human Fc portion of the IgG molecule can be PCR amplified, using primers that span the 5' and 3' ends of the sequence described below. These primers also should have convenient restriction enzyme sites that will facilitate cloning into an expression vector, preferably a mammalian expression vector.

For example, if pC4 (Accession No. 209646) is used, the human Fc portion can be ligated into the BamHI cloning site. Note that the 3' BamHI site should be destroyed. Next, the vector containing the human Fc portion is re-restricted with BamHI, linearizing the vector, and a polynucleotide of the present invention, isolated by the PCR protocol described in Example 1, is ligated into this BamHI site. Note that the polynucleotide is cloned without

a stop codon, otherwise a fusion protein will not be produced.

If the naturally occurring signal sequence is used to produce the polypeptide of the present invention, pC4 does not need a second signal peptide. Alternatively, if the naturally occurring signal sequence is not used, the vector can be modified to include a heterologous signal sequence. (See, e.g., WO 96/34891.)

Human IgG Fc region:

GGGATCCGGAGCCCAAATCTTCTGACAAAACTCACACATGCCCACCGTGCCCAG
CACCTGAATTCGAGGGTGCACCGTCAGTCTTCCTCTTCCCCCCAAAACCCAAGGA
CACCCTCATGATCTCCCGGACTCCTGAGGTCACATGCGTGGTGGTGGACGTAAGC
CACGAAGACCCTGAGGTCAAGTTCAACTGGTACGTGGACGGCGTGGAGGTGCAT
AATGCCAAGACAAAGCCGCGGGAGGAGCAGTACAACAGCACGTACCGTGTGGTC
AGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAATGGCAAGGAGTACAAGTGC
AAGGTCTCCAACAAAGCCCTCCCAACCCCCATCGAGAAAACCATCTCCAAAGCC
AAAGGGCAGCCCCGAGAACCACAGGTGTACACCCTGCCCCCATCCCGGGATGAG
CTGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTATCCAAGC
GACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGAC
CACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAAGCTCACC
GTGGACAAGAGCAGGTGGCAGCAGGGGAACGTCTTCTCATGCTCCGTGATGCAT
GAGGCTCTGCACAACCACTACACGCAGAAGAGCCTCTCCCTGTCTCCGGGTAAAT
GAGTGCGACGGCCGCGACTCTAGAGGAT (SEQ ID NO:1547)

Example 10: Production of an Antibody from a Polypeptide

a) Hybridoma Technology

The antibodies of the present invention can be prepared by a variety of methods. (See, Current Protocols, Chapter 2.) As one example of such methods, cells expressing polypeptide of the present invention are administered to an animal to induce the production of sera containing polyclonal antibodies. In a preferred method, a preparation of polypeptide of the present invention is prepared and purified to render it substantially free of natural contaminants. Such a preparation is then introduced into an animal in order to produce polyclonal antisera of greater specific activity.

Monoclonal antibodies specific for polypeptide of the present invention are prepared using hybridoma technology. (Kohler et al., Nature 256:495 (1975); Kohler et al., Eur. J. Immunol. 6:511 (1976); Kohler et al., Eur. J. Immunol. 6:292 (1976); Hammerling et al., in: Monoclonal Antibodies and T-Cell Hybridomas, Elsevier, N.Y., pp. 563-681 (1981)). In general, an animal (preferably a mouse) is immunized with polypeptide of the present invention or, more preferably, with a secreted polypeptide of the present invention-expressing cell. Such polypeptide-expressing cells are cultured in any suitable tissue culture medium, preferably in Earle's modified Eagle's medium supplemented with 10% fetal bovine serum (inactivated at about 56°C), and supplemented with about 10 g/l of nonessential amino acids, about 1,000 U/ml of penicillin, and about 100 µg/ml of streptomycin.

The splenocytes of such mice are extracted and fused with a suitable myeloma cell line. Any suitable myeloma cell line may be employed in accordance with the present invention; however, it is preferable to employ the parent myeloma cell line (SP2O), available from the ATCC. After fusion, the resulting hybridoma cells are selectively maintained in HAT medium, and then cloned by limiting dilution as described by Wands et al. (Gastroenterology 80:225-232 (1981)). The hybridoma cells obtained through such a selection are then assayed to identify clones which secrete antibodies capable of binding the polypeptide of the present invention.

Alternatively, additional antibodies capable of binding to polypeptide of the present invention can be produced in a two-step procedure using anti-idiotypic antibodies. Such a method makes use of the fact that antibodies are themselves antigens, and therefore, it is possible to obtain an antibody which binds to a second antibody. In accordance with this method, protein specific antibodies are used to immunize an animal, preferably a mouse. The splenocytes of such an animal are then used to produce hybridoma cells, and the hybridoma cells are screened to identify clones which produce an antibody whose ability to bind to the polypeptide of the present invention-specific antibody can be blocked by polypeptide of the present invention. Such antibodies comprise anti-idiotypic antibodies to the polypeptide of the present invention-specific antibody and are used to immunize an animal to induce formation of further polypeptide of the present invention-specific antibodies.

For in vivo use of antibodies in humans, an antibody is "humanized". Such antibodies can be produced using genetic constructs derived from hybridoma cells producing the monoclonal antibodies described above. Methods for producing chimeric and humanized

antibodies are known in the art and are discussed herein. (See, for review, Morrison, Science 229:1202 (1985); Oi et al., BioTechniques 4:214 (1986); Cabilly et al., U.S. Patent No. 4,816,567; Taniguchi et al., EP 171496; Morrison et al., EP 173494; Neuberger et al., WO 8601533; Robinson et al., WO 8702671; Boulianne et al., Nature 312:643 (1984); Neuberger et al., Nature 314:268 (1985).)

b) Isolation Of Antibody Fragments Directed Against Polypeptide of the Present Invention From A Library Of scFvs

Naturally occurring V-genes isolated from human PBLs are constructed into a library of antibody fragments which contain reactivities against polypeptide of the present invention to which the donor may or may not have been exposed (see e.g., U.S. Patent 5,885,793 incorporated herein by reference in its entirety).

Rescue of the Library. A library of scFvs is constructed from the RNA of human PBLs as described in PCT publication WO 92/01047. To rescue phage displaying antibody fragments, approximately 109 E. coli harboring the phagemid are used to inoculate 50 ml of 2xTY containing 1% glucose and 100 µg/ml of ampicillin (2xTY-AMP-GLU) and grown to an O.D. of 0.8 with shaking. Five ml of this culture is used to innoculate 50 ml of 2xTY-AMP-GLU, 2 x 108 TU of delta gene 3 helper (M13 delta gene III, see PCT publication WO 92/01047) are added and the culture incubated at 37°C for 45 minutes without shaking and then at 37°C for 45 minutes with shaking. The culture is centrifuged at 4000 r.p.m. for 10 min. and the pellet resuspended in 2 liters of 2xTY containing 100 µg/ml ampicillin and 50 ug/ml kanamycin and grown overnight. Phage are prepared as described in PCT publication WO 92/01047.

M13 delta gene III is prepared as follows: M13 delta gene III helper phage does not encode gene III protein, hence the phage(mid) displaying antibody fragments have a greater avidity of binding to antigen. Infectious M13 delta gene III particles are made by growing the helper phage in cells harboring a pUC19 derivative supplying the wild type gene III protein during phage morphogenesis. The culture is incubated for 1 hour at 37° C without shaking and then for a further hour at 37°C with shaking. Cells are spun down (IEC-Centra 8,400 r.p.m. for 10 min), resuspended in 300 ml 2xTY broth containing 100 µg ampicillin/ml and 25 µg kanamycin/ml (2xTY-AMP-KAN) and grown overnight, shaking at 37°C. Phage particles are purified and concentrated from the culture medium by two PEG-precipitations

(Sambrook et al.. 1990). resuspended in 2 ml PBS and passed through a 0.45 µm filter (Minisart NML: Sartorius) to give a final concentration of approximately 1013 transducing units/ml (ampicillin-resistant clones).

Panning of the Library. Immunotubes (Nunc) are coated overnight in PBS with 4 ml of either 100 µg/ml or 10 µg/ml of a polypeptide of the present invention. Tubes are blocked with 2% Marvel-PBS for 2 hours at 37°C and then washed 3 times in PBS. Approximately 1013 TU of phage is applied to the tube and incubated for 30 minutes at room temperature tumbling on an over and under turntable and then left to stand for another 1.5 hours. Tubes are washed 10 times with PBS 0.1% Tween-20 and 10 times with PBS. Phage are eluted by adding 1 ml of 100 mM triethylamine and rotating 15 minutes on an under and over turntable after which the solution is immediately neutralized with 0.5 ml of 1.0M Tris-HCl, pH 7.4. Phage are then used to infect 10 ml of mid-log E. coli TG1 by incubating eluted phage with bacteria for 30 minutes at 37°C. The E. coli are then plated on TYE plates containing 1% glucose and 100 µg/ml ampicillin. The resulting bacterial library is then rescued with delta gene 3 helper phage as described above to prepare phage for a subsequent round of selection. This process is then repeated for a total of 4 rounds of affinity purification with tube-washing increased to 20 times with PBS, 0.1% Tween-20 and 20 times with PBS for rounds 3 and 4.

Characterization of Binders. Eluted phage from the 3rd and 4th rounds of selection are used to infect E. coli HB 2151 and soluble scFv is produced (Marks, et al., 1991) from single colonies for assay. ELISAs are performed with microtitre plates coated with either 10 pg/ml of the polypeptide of the present invention in 50 mM bicarbonate pH 9.6. Clones positive in ELISA are further characterized by PCR fingerprinting (see, e.g., PCT publication WO 92/01047) and then by sequencing. These ELISA positive clones may also be further characterized by techniques known in the art, such as, for example, epitope mapping, binding affinity, receptor signal transduction, ability to block or competitively inhibit antibody/antigen binding, and competitive agonistic or antagonistic activity.

Example 11: Method of Determining Alterations in a Gene Corresponding to a Polynucleotide

RNA isolated from entire families or individual patients presenting with a phenotype of interest (such as a disease) is be isolated. cDNA is then generated from these RNA

samples using protocols known in the art. (See, Sambrook.) The cDNA is then used as a template for PCR, employing primers surrounding regions of interest in SEQ ID NO:X; and/or the nucleotide sequence of the related cDNA in the cDNA clone contained in a deposited library. Suggested PCR conditions consist of 35 cycles at 95 degrees C for 30 seconds; 60-120 seconds at 52-58 degrees C; and 60-120 seconds at 70 degrees C, using buffer solutions described in Sidransky et al., Science 252:706 (1991).

PCR products are then sequenced using primers labeled at their 5' end with T4 polynucleotide kinase, employing SequiTherm Polymerase. (Epicentre Technologies). The intron-exon borders of selected exons is also determined and genomic PCR products analyzed to confirm the results. PCR products harboring suspected mutations is then cloned and sequenced to validate the results of the direct sequencing.

PCR products is cloned into T-tailed vectors as described in Holton et al., Nucleic Acids Research, 19:1156 (1991) and sequenced with T7 polymerase (United States Biochemical). Affected individuals are identified by mutations not present in unaffected individuals.

Genomic rearrangements are also observed as a method of determining alterations in a gene corresponding to a polynucleotide. Genomic clones isolated according to Example 2 are nick-translated with digoxigenindeoxy-uridine 5'-triphosphate (Boehringer Manheim), and FISH performed as described in Johnson et al., Methods Cell Biol. 35:73-99 (1991). Hybridization with the labeled probe is carried out using a vast excess of human cot-1 DNA for specific hybridization to the corresponding genomic locus.

Chromosomes are counterstained with 4,6-diamino-2-phenylidole and propidium iodide, producing a combination of C- and R-bands. Aligned images for precise mapping are obtained using a triple-band filter set (Chroma Technology, Brattleboro, VT) in combination with a cooled charge-coupled device camera (Photometrics, Tucson, AZ) and variable excitation wavelength filters. (Johnson et al., Genet. Anal. Tech. Appl., 8:75 (1991).) Image collection, analysis and chromosomal fractional length measurements are performed using the ISee Graphical Program System. (Inovision Corporation, Durham, NC.) Chromosome alterations of the genomic region hybridized by the probe are identified as insertions, deletions, and translocations. These alterations are used as a diagnostic marker for an associated disease.

Example 12: Method of Detecting Abnormal Levels of a Polypeptide in a Biological Sample

A polypeptide of the present invention can be detected in a biological sample, and if an increased or decreased level of the polypeptide is detected, this polypeptide is a marker for a particular phenotype. Methods of detection are numerous, and thus, it is understood that one skilled in the art can modify the following assay to fit their particular needs.

For example, antibody-sandwich ELISAs are used to detect polypeptides in a sample, preferably a biological sample. Wells of a microtiter plate are coated with specific antibodies, at a final concentration of 0.2 to 10 ug/ml. The antibodies are either monoclonal or polyclonal and are produced by the method described in Example 10. The wells are blocked so that non-specific binding of the polypeptide to the well is reduced.

The coated wells are then incubated for > 2 hours at RT with a sample containing the polypeptide. Preferably, serial dilutions of the sample should be used to validate results. The plates are then washed three times with deionized or distilled water to remove unbounded polypeptide.

Next, 50 ul of specific antibody-alkaline phosphatase conjugate, at a concentration of 25-400 ng, is added and incubated for 2 hours at room temperature. The plates are again washed three times with deionized or distilled water to remove unbounded conjugate.

Add 75 ul of 4-methylumbelliferyl phosphate (MUP) or p-nitrophenyl phosphate (NPP) substrate solution to each well and incubate 1 hour at room temperature. Measure the reaction by a microtiter plate reader. Prepare a standard curve, using serial dilutions of a control sample, and plot polypeptide concentration on the X-axis (log scale) and fluorescence or absorbance of the Y-axis (linear scale). Interpolate the concentration of the polypeptide in the sample using the standard curve.

Example 13: Formulation

The invention also provides methods of treatment and/or prevention of diseases or disorders (such as, for example, any one or more of the diseases or disorders disclosed herein) by administration to a subject of an effective amount of a Therapeutic. By therapeutic is meant a polynucleotides or polypeptides of the invention (including fragments and variants), agonists or antagonists thereof, and/or antibodies thereto, in combination with

a pharmaceutically acceptable carrier type (e.g., a sterile carrier).

The Therapeutic will be formulated and dosed in a fashion consistent with good medical practice, taking into account the clinical condition of the individual patient (especially the side effects of treatment with the Therapeutic alone), the site of delivery, the method of administration, the scheduling of administration, and other factors known to practitioners. The "effective amount" for purposes herein is thus determined by such considerations.

As a general proposition, the total pharmaceutically effective amount of the Therapeutic administered parenterally per dose will be in the range of about 1ug/kg/day to 10 mg/kg/day of patient body weight, although, as noted above, this will be subject to therapeutic discretion. More preferably, this dose is at least 0.01 mg/kg/day, and most preferably for humans between about 0.01 and 1 mg/kg/day for the hormone. If given continuously, the Therapeutic is typically administered at a dose rate of about 1 ug/kg/hour to about 50 ug/kg/hour, either by 1-4 injections per day or by continuous subcutaneous infusions, for example, using a mini-pump. An intravenous bag solution may also be employed. The length of treatment needed to observe changes and the interval following treatment for responses to occur appears to vary depending on the desired effect.

Therapeutics can be are administered orally, rectally, parenterally, intracistemally, intravaginally, intraperitoneally, topically (as by powders, ointments, gels, drops or transdermal patch), bucally, or as an oral or nasal spray. "Pharmaceutically acceptable carrier" refers to a non-toxic solid, semisolid or liquid filler, diluent, encapsulating material or formulation auxiliary of any. The term "parenteral" as used herein refers to modes of administration which include intravenous, intramuscular, intraperitoneal, intrasternal, subcutaneous and intraarticular injection and infusion.

Therapeutics of the invention are also suitably administered by sustained-release systems. Suitable examples of sustained-release Therapeutics are administered orally, rectally, parenterally, intracistemally, intravaginally, intraperitoneally, topically (as by powders, ointments, gels, drops or transdermal patch), bucally, or as an oral or nasal spray. "Pharmaceutically acceptable carrier" refers to a non-toxic solid, semisolid or liquid filler, diluent, encapsulating material or formulation auxiliary of any type. The term "parenteral" as used herein refers to modes of administration which include intravenous, intramuscular, intraperitoneal, intrasternal, subcutaneous and intraarticular injection and infusion.

Therapeutics of the invention are also suitably administered by sustained-release systems. Suitable examples of sustained-release Therapeutics include suitable polymeric materials (such as, for example, semi-permeable polymer matrices in the form of shaped articles, e.g., films, or mirocapsules), suitable hydrophobic materials (for example as an emulsion in an acceptable oil) or ion exchange resins, and sparingly soluble derivatives (such as, for example, a sparingly soluble salt).

Sustained-release matrices include polylactides (U.S. Pat. No. 3,773,919, EP 58,481), copolymers of L-glutamic acid and gamma-ethyl-L-glutamate (Sidman et al., Biopolymers 22:547-556 (1983)), poly (2- hydroxyethyl methacrylate) (Langer et al., J. Biomed. Mater. Res. 15:167-277 (1981), and Langer, Chem. Tech. 12:98-105 (1982)), ethylene vinyl acetate (Langer et al., Id.) or poly-D- (-)-3-hydroxybutyric acid (EP 133,988).

Sustained-release Therapeutics also include liposomally entrapped Therapeutics of the invention (*see* generally, Langer, *Science* 249:1527-1533 (1990); Treat et al., in *Liposomes in the Therapy of Infectious Disease and Cancer*, Lopez-Berestein and Fidler (eds.), Liss, New York, pp. 317 -327 and 353-365 (1989)). Liposomes containing the Therapeutic are prepared by methods known per se: DE 3,218,121; Epstein et al., Proc. Natl. Acad. Sci. (USA) 82:3688-3692 (1985); Hwang et al., Proc. Natl. Acad. Sci.(USA) 77:4030-4034 (1980); EP 52,322; EP 36,676; EP 88,046; EP 143,949; EP 142,641; Japanese Pat. Appl. 83-118008; U.S. Pat. Nos. 4,485,045 and 4,544,545; and EP 102,324. Ordinarily, the liposomes are of the small (about 200-800 Angstroms) unilamellar type in which the lipid content is greater than about 30 mol. percent cholesterol, the selected proportion being adjusted for the optimal Therapeutic.

In yet an additional embodiment, the Therapeutics of the invention are delivered by way of a pump (*see* Langer, *supra*; Sefton, CRC Crit. Ref. Biomed. Eng. 14:201 (1987); Buchwald et al., Surgery 88:507 (1980); Saudek et al., N. Engl. J. Med. 321:574 (1989)).

Other controlled release systems are discussed in the review by Langer (*Science* 249:1527-1533 (1990)).

For parenteral administration, in one embodiment, the Therapeutic is formulated generally by mixing it at the desired degree of purity, in a unit dosage injectable form (solution, suspension, or emulsion), with a pharmaceutically acceptable carrier, i.e., one that is non-toxic to recipients at the dosages and concentrations employed and is compatible with other ingredients of the formulation. For example, the formulation preferably does not

include oxidizing agents and other compounds that are known to be deleterious to the Therapeutic.

Generally, the formulations are prepared by contacting the Therapeutic uniformly and intimately with liquid carriers or finely divided solid carriers or both. Then, if necessary, the product is shaped into the desired formulation. Preferably the carrier is a parenteral carrier, more preferably a solution that is isotonic with the blood of the recipient. Examples of such carrier vehicles include water, saline, Ringer's solution, and dextrose solution. Non-aqueous vehicles such as fixed oils and ethyl oleate are also useful herein, as well as liposomes.

The carrier suitably contains minor amounts of additives such as substances that enhance isotonicity and chemical stability. Such materials are non-toxic to recipients at the dosages and concentrations employed, and include buffers such as phosphate, citrate, succinate, acetic acid, and other organic acids or their salts; antioxidants such as ascorbic acid; low molecular weight (less than about ten residues) polypeptides, e.g., polyarginine or tripeptides; proteins, such as serum albumin, gelatin, or immunoglobulins; hydrophilic polymers such as polyvinylpyrrolidone; amino acids, such as glycine, glutamic acid, aspartic acid, or arginine; monosaccharides, disaccharides, and other carbohydrates including cellulose or its derivatives, glucose, manose, or dextrins; chelating agents such as EDTA; sugar alcohols such as mannitol or sorbitol; counterions such as sodium; and/or nonionic surfactants such as polysorbates, poloxamers, or PEG.

The Therapeutic is typically formulated in such vehicles at a concentration of about 0.1 mg/ml to 100 mg/ml, preferably 1-10 mg/ml, at a pH of about 3 to 8. It will be understood that the use of certain of the foregoing excipients, carriers, or stabilizers will result in the formation of polypeptide salts.

Any pharmaceutical used for therapeutic administration can be sterile. Sterility is readily accomplished by filtration through sterile filtration membranes (e.g., 0.2 micron membranes). Therapeutics generally are placed into a container having a sterile access port, for example, an intravenous solution bag or vial having a stopper pierceable by a hypodermic injection needle.

Therapeutics ordinarily will be stored in unit or multi-dose containers, for example, sealed ampoules or vials, as an aqueous solution or as a lyophilized formulation for reconstitution. As an example of a lyophilized formulation, 10-ml vials are filled with 5 ml of sterile-filtered 1% (w/v) aqueous Therapeutic solution, and the resulting mixture is

lyophilized. The infusion solution is prepared by reconstituting the lyophilized Therapeutic using bacteriostatic Water-for-Injection.

The invention also provides a pharmaceutical pack or kit comprising one or more containers filled with one or more of the ingredients of the Therapeutics of the invention. Associated with such container(s) can be a notice in the form prescribed by a governmental agency regulating the manufacture, use or sale of pharmaceuticals or biological products, which notice reflects approval by the agency of manufacture, use or sale for human administration. In addition, the Therapeutics may be employed in conjunction with other therapeutic compounds.

The Therapeutics of the invention may be administered alone or in combination with adjuvants. Adjuvants that may be administered with the Therapeutics of the invention include, but are not limited to, alum, alum plus deoxycholate (ImmunoAg), MTP-PE (Biocine Corp.), QS21 (Genentech, Inc.), BCG, and MPL. In a specific embodiment, Therapeutics of the invention are administered in combination with alum. In another specific embodiment, Therapeutics of the invention are administered in combination with QS-21. Further adjuvants that may be administered with the Therapeutics of the invention include, but are not limited to, Monophosphoryl lipid immunomodulator, AdjuVax 100a, QS-21, QS-18, CRL1005, Aluminum salts, MF-59, and Virosomal adjuvant technology. Vaccines that may be administered with the Therapeutics of the invention include, but are not limited to, vaccines directed toward protection against MMR (measles, mumps, rubella), polio, varicella, tetanus/diptheria, hepatitis A, hepatitis B, haemophilus influenzae B, whooping cough, pneumonia, influenza, Lyme's Disease, rotavirus, cholera, yellow fever, Japanese encephalitis, poliomyelitis, rabies, typhoid fever, and pertussis. Combinations may be administered either concomitantly, e.g., as an admixture, separately but simultaneously or concurrently; or sequentially. This includes presentations in which the combined agents are administered together as a therapeutic mixture, and also procedures in which the combined agents are administered separately but simultaneously, e.g., as through separate intravenous lines into the same individual. Administration "in combination" further includes the separate administration of one of the compounds or agents given first, followed by the second.

The Therapeutics of the invention may be administered alone or in combination with other therapeutic agents. Therapeutic agents that may be administered in combination with the Therapeutics of the invention, include but not limited to, other members of the TNF

family, chemotherapeutic agents, antibiotics, steroidal and non-steroidal anti-inflammatories, conventional immunotherapeutic agents, cytokines and/or growth factors. Combinations may be administered either concomitantly, e.g., as an admixture, separately but simultaneously or concurrently; or sequentially. This includes presentations in which the combined agents are administered together as a therapeutic mixture, and also procedures in which the combined agents are administered separately but simultaneously, e.g., as through separate intravenous lines into the same individual. Administration "in combination" further includes the separate administration of one of the compounds or agents given first, followed by the second.

In one embodiment, the Therapeutics of the invention are administered in combination with members of the TNF family. TNF, TNF-related or TNF-like molecules that may be administered with the Therapeutics of the invention include, but are not limited to, soluble forms of TNF-alpha, lymphotoxin-alpha (LT-alpha, also known as TNF-beta), LT-beta (found in complex heterotrimer LT-alpha2-beta), OPGL, FasL, CD27L, CD30L, CD40L, 4-1BBL, DcR3, OX40L, TNF-gamma (International Publication No. WO 96/14328), AIM-I (International Publication No. WO 97/33899), endokine-alpha (International Publication No. WO 98/07880), TR6 (International Publication No. WO 98/30694), OPG, and neutrokine-alpha (International Publication No. WO 98/18921, OX40, and nerve growth factor (NGF), and soluble forms of Fas, CD30, CD27, CD40 and 4-IBB, TR2 (International Publication No. WO 96/34095), DR3 (International Publication No. WO 97/33904), DR4 (International Publication No. WO 98/32856), TR5 (International Publication No. WO 98/30693), TR6 (International Publication No. WO 98/30694), TR7 (International Publication No. WO 98/41629), TRANK, TR9 (International Publication No. WO 98/56892).TR10 (International Publication No. WO 98/54202), 312C2 (International Publication No. WO 98/06842), and TR12, and soluble forms CD154, CD70, and CD153.

In certain embodiments, Therapeutics of the invention are administered in combination with antiretroviral agents, nucleoside reverse transcriptase inhibitors, non-nucleoside reverse transcriptase inhibitors, and/or protease inhibitors. Nucleoside reverse transcriptase inhibitors that may be administered in combination with the Therapeutics of the invention, include, but are not limited to, RETROVIR™ (zidovudine/AZT), VIDEX™ (didanosine/ddI), HIVID™ (zalcitabine/ddC), ZERIT™ (stavudine/d4T), EPIVIR™ (lamivudine/3TC), and COMBIVIR™ (zidovudine/lamivudine). Non-nucleoside reverse transcriptase inhibitors that may be administered in combination with the Therapeutics of the

invention. include. but are not limited to. VIRAMUNE™ (nevirapine). RESCRIPTOR™ (delavirdine). and SUSTIVA™ (efavirenz). Protease inhibitors that may be administered in combination with the Therapeutics of the invention, include, but are not limited to, CRIXIVAN™ (indinavir), NORVIR™ (ritonavir), INVIRASE™ (saquinavir), and VIRACEPT™ (nelfinavir). In a specific embodiment, antiretroviral agents, nucleoside reverse transcriptase inhibitors. non-nucleoside reverse transcriptase inhibitors, and/or protease inhibitors may be used in any combination with Therapeutics of the invention to treat AIDS and/or to prevent or treat HIV infection.

In other embodiments, Therapeutics of the invention may be administered in combination with anti-opportunistic infection agents. Anti-opportunistic agents that may be administered in combination with the Therapeutics of the invention, include, but are not limited to, TRIMETHOPRIM-SULFAMETHOXAZOLE™, DAPSONE™, PENTAMIDINE™, ATOVAQUONE™, ISONIAZID™, RIFAMPIN™, PYRAZINAMIDE™, ETHAMBUTOL™, RIFABUTIN™, CLARITHROMYCIN™, AZITHROMYCIN™, GANCICLOVIR™, FOSCARNET™, CIDOFOVIR™, FLUCONAZOLE™, ITRACONAZOLE™, KETOCONAZOLE™, ACYCLOVIR™, FAMCICOLVIR™, PYRIMETHAMINE™, LEUCOVORIN™, NEUPOGEN™ (filgrastim/G-CSF), and LEUKINE™ (sargramostim/GM-CSF). In a specific embodiment, Therapeutics of the invention are used in any combination with TRIMETHOPRIM-SULFAMETHOXAZOLE™, DAPSONE™, PENTAMIDINE™, and/or ATOVAQUONE™ to prophylactically treat or prevent an opportunistic *Pneumocystis carinii* pneumonia infection. In another specific embodiment, Therapeutics of the invention are used in any combination with ISONIAZID™, RIFAMPIN™, PYRAZINAMIDE™, and/or ETHAMBUTOL™ to prophylactically treat or prevent an opportunistic *Mycobacterium avium* complex infection. In another specific embodiment, Therapeutics of the invention are used in any combination with RIFABUTIN™, CLARITHROMYCIN™, and/or AZITHROMYCIN™ to prophylactically treat or prevent an opportunistic *Mycobacterium tuberculosis* infection. In another specific embodiment, Therapeutics of the invention are used in any combination with GANCICLOVIR™, FOSCARNET™. and/or CIDOFOVIR™ to prophylactically treat or prevent an opportunistic cytomegalovirus infection. In another specific embodiment, Therapeutics of the invention are used in any combination with FLUCONAZOLE™, ITRACONAZOLE™, and/or

KETOCONAZOLE™ to prophylactically treat or prevent an opportunistic fungal infection. In another specific embodiment, Therapeutics of the invention are used in any combination with ACYCLOVIR™ and/or FAMCICOLVIR™ to prophylactically treat or prevent an opportunistic herpes simplex virus type I and/or type II infection. In another specific embodiment, Therapeutics of the invention are used in any combination with PYRIMETHAMINE™ and/or LEUCOVORIN™ to prophylactically treat or prevent an opportunistic *Toxoplasma gondii* infection. In another specific embodiment, Therapeutics of the invention are used in any combination with LEUCOVORIN™ and/or NEUPOGEN™ to prophylactically treat or prevent an opportunistic bacterial infection.

In a further embodiment, the Therapeutics of the invention are administered in combination with an antiviral agent. Antiviral agents that may be administered with the Therapeutics of the invention include, but are not limited to, acyclovir, ribavirin, amantadine, and remantidine.

In a further embodiment, the Therapeutics of the invention are administered in combination with an antibiotic agent. Antibiotic agents that may be administered with the Therapeutics of the invention include, but are not limited to, amoxicillin, beta-lactamases, aminoglycosides, beta-lactam (glycopeptide), beta-lactamases, Clindamycin, chloramphenicol, cephalosporins, ciprofloxacin, ciprofloxacin, erythromycin, fluoroquinolones, macrolides, metronidazole, penicillins, quinolones, rifampin, streptomycin, sulfonamide, tetracyclines, trimethoprim, trimethoprim-sulfamthoxazole, and vancomycin.

Conventional nonspecific immunosuppressive agents, that may be administered in combination with the Therapeutics of the invention include, but are not limited to, steroids, cyclosporine, cyclosporine analogs, cyclophosphamide methylprednisone, prednisone, azathioprine, FK-506, 15-deoxyspergualin, and other immunosuppressive agents that act by suppressing the function of responding T cells.

In specific embodiments, Therapeutics of the invention are administered in combination with immunosuppressants. Immunosuppressants preparations that may be administered with the Therapeutics of the invention include, but are not limited to, ORTHOCLONE™ (OKT3), SANDIMMUNE™/NEORAL™/SANGDYA™ (cyclosporin), PROGRAF™ (tacrolimus), CELLCEPT™ (mycophenolate), Azathioprine, glucorticosteroids, and RAPAMUNE™ (sirolimus). In a specific embodiment, immunosuppressants may be

used to prevent rejection of organ or bone marrow transplantation.

In an additional embodiment, Therapeutics of the invention are administered alone or in combination with one or more intravenous immune globulin preparations. Intravenous immune globulin preparations that may be administered with the Therapeutics of the invention include, but not limited to, GAMMAR™, IVEEGAM™, SANDOGLOBULIN™, GAMMAGARD S/D™, and GAMIMUNE™. In a specific embodiment, Therapeutics of the invention are administered in combination with intravenous immune globulin preparations in transplantation therapy (e.g., bone marrow transplant).

In an additional embodiment, the Therapeutics of the invention are administered alone or in combination with an anti-inflammatory agent. Anti-inflammatory agents that may be administered with the Therapeutics of the invention include, but are not limited to, glucocorticoids and the nonsteroidal anti-inflammatories, aminoarylcarboxylic acid derivatives, arylacetic acid derivatives, arylbutyric acid derivatives, arylcarboxylic acids, arylpropionic acid derivatives, pyrazoles, pyrazolones, salicylic acid derivatives, thiazinecarboxamides, e-acetamidocaproic acid, S-adenosylmethionine, 3-amino-4-hydroxybutyric acid, amixetrine, bendazac, benzydamine, bucolome, difenpiramide, ditazol, emorfazone, guaiazulene, nabumetone, nimesulide, orgotein, oxaceprol, paranyline, perisoxal, pifoxime, proquazone, proxazole, and tenidap.

In another embodiment, compostions of the invention are administered in combination with a chemotherapeutic agent. Chemotherapeutic agents that may be administered with the Therapeutics of the invention include, but are not limited to, antibiotic derivatives (e.g., doxorubicin, bleomycin, daunorubicin, and dactinomycin); antiestrogens (e.g., tamoxifen); antimetabolites (e.g., fluorouracil, 5-FU, methotrexate, floxuridine, interferon alpha-2b, glutamic acid, plicamycin, mercaptopurine, and 6-thioguanine); cytotoxic agents (e.g., carmustine, BCNU, lomustine, CCNU, cytosine arabinoside, cyclophosphamide, estramustine, hydroxyurea, procarbazine, mitomycin, busulfan, cis-platin, and vincristine sulfate); hormones (e.g., medroxyprogesterone, estramustine phosphate sodium, ethinyl estradiol, estradiol, megestrol acetate, methyltestosterone, diethylstilbestrol diphosphate, chlorotrianisene, and testolactone); nitrogen mustard derivatives (e.g., mephalen, chorambucil, mechlorethamine (nitrogen mustard) and thiotepa); steroids and combinations (e.g., bethamethasone sodium phosphate); and others (e.g., dicarbazine, asparaginase, mitotane, vincristine sulfate, vinblastine sulfate, and etoposide).

In a specific embodiment, Therapeutics of the invention are administered in combination with CHOP (cyclophosphamide, doxorubicin, vincristine, and prednisone) or any combination of the components of CHOP. In another embodiment, Therapeutics of the invention are administered in combination with Rituximab. In a further embodiment, Therapeutics of the invention are administered with Rituxmab and CHOP, or Rituxmab and any combination of the components of CHOP.

In an additional embodiment, the Therapeutics of the invention are administered in combination with cytokines. Cytokines that may be administered with the Therapeutics of the invention include, but are not limited to, IL2, IL3, IL4, IL5, IL6, IL7, IL10, IL12, IL13, IL15, anti-CD40, CD40L, IFN-gamma and TNF-alpha. In another embodiment, Therapeutics of the invention may be administered with any interleukin, including, but not limited to, IL-1alpha, IL-1beta, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-11, IL-12, IL-13, IL-14, IL-15, IL-16, IL-17, IL-18, IL-19, IL-20, and IL-21.

In an additional embodiment, the Therapeutics of the invention are administered in combination with angiogenic proteins. Angiogenic proteins that may be administered with the Therapeutics of the invention include, but are not limited to, Glioma Derived Growth Factor (GDGF), as disclosed in European Patent Number EP-399816; Platelet Derived Growth Factor-A (PDGF-A), as disclosed in European Patent Number EP-682110; Platelet Derived Growth Factor-B (PDGF-B), as disclosed in European Patent Number EP-282317; Placental Growth Factor (PlGF), as disclosed in International Publication Number WO 92/06194; Placental Growth Factor-2 (PlGF-2), as disclosed in Hauser et al., Gorwth Factors, 4:259-268 (1993); Vascular Endothelial Growth Factor (VEGF), as disclosed in International Publication Number WO 90/13649; Vascular Endothelial Growth Factor-A (VEGF-A), as disclosed in European Patent Number EP-506477; Vascular Endothelial Growth Factor-2 (VEGF-2), as disclosed in International Publication Number WO 96/39515; Vascular Endothelial Growth Factor B (VEGF-3); Vascular Endothelial Growth Factor B-186 (VEGF-B186), as disclosed in International Publication Number WO 96/26736; Vascular Endothelial Growth Factor-D (VEGF-D), as disclosed in International Publication Number WO 98/02543; Vascular Endothelial Growth Factor-D (VEGF-D), as disclosed in International Publication Number WO 98/07832; and Vascular Endothelial Growth Factor-E (VEGF-E), as disclosed in German Patent Number DE19639601. The above mentioned references are incorporated herein by reference herein.

In an additional embodiment, the Therapeutics of the invention are administered in combination with hematopoietic growth factors. Hematopoietic growth factors that may be administered with the Therapeutics of the invention include, but are not limited to, LEUKINE™ (SARGRAMOSTIM™) and NEUPOGEN™ (FILGRASTIM™).

In an additional embodiment, the Therapeutics of the invention are administered in combination with Fibroblast Growth Factors. Fibroblast Growth Factors that may be administered with the Therapeutics of the invention include, but are not limited to, FGF-1, FGF-2, FGF-3, FGF-4, FGF-5, FGF-6, FGF-7, FGF-8, FGF-9, FGF-10, FGF-11, FGF-12, FGF-13, FGF-14, and FGF-15.

In additional embodiments, the Therapeutics of the invention are administered in combination with other therapeutic or prophylactic regimens, such as, for example, radiation therapy.

Example 14: Method of Treating Decreased Levels of the Polypeptide

The present invention relates to a method for treating an individual in need of an increased level of a polypeptide of the invention in the body comprising administering to such an individual a composition comprising a therapeutically effective amount of an agonist of the invention (including polypeptides of the invention). Moreover, it will be appreciated that conditions caused by a decrease in the standard or normal expression level of a polypeptide of the present invention in an individual can be treated by administering the agonist or antagonist of the present invention. Thus, the invention also provides a method of treatment of an individual in need of an increased level of the polypeptide comprising administering to such an individual a Therapeutic comprising an amount of the agonist or antagonist to increase the activity level of the polypeptide in such an individual.

For example, a patient with decreased levels of a polypeptide receives a daily dose 0.1-100 ug/kg of the agonist or antagonist for six consecutive days. The exact details of the dosing scheme, based on administration and formulation, are provided in Example 13.

Example 15: Method of Treating Increased Levels of the Polypeptide

The present invention also relates to a method of treating an individual in need of a

decreased level of a polypeptide of the invention in the body comprising administering to such an individual a composition comprising a therapeutically effective amount of an antagonist of the invention (including polypeptides and antibodies of the invention).

In one example, antisense technology is used to inhibit production of a polypeptide of the present invention. This technology is one example of a method of decreasing levels of a polypeptide, due to a variety of etiologies, such as cancer.

For example, a patient diagnosed with abnormally increased levels of a polypeptide is administered intravenously antisense polynucleotides at 0.5, 1.0, 1.5, 2.0 and 3.0 mg/kg day for 21 days. This treatment is repeated after a 7-day rest period if the treatment was well tolerated. The formulation of the antisense polynucleotide is provided in Example 13.

Example 16: Method of Treatment Using Gene Therapy-Ex Vivo

One method of gene therapy transplants fibroblasts, which are capable of expressing a polypeptide, onto a patient. Generally, fibroblasts are obtained from a subject by skin biopsy. The resulting tissue is placed in tissue-culture medium and separated into small pieces. Small chunks of the tissue are placed on a wet surface of a tissue culture flask, approximately ten pieces are placed in each flask. The flask is turned upside down, closed tight and left at room temperature over night. After 24 hours at room temperature, the flask is inverted and the chunks of tissue remain fixed to the bottom of the flask and fresh media (e.g., Ham's F12 media, with 10% FBS, penicillin and streptomycin) is added. The flasks are then incubated at 37 degree C for approximately one week.

At this time, fresh media is added and subsequently changed every several days. After an additional two weeks in culture, a monolayer of fibroblasts emerge. The monolayer is trypsinized and scaled into larger flasks.

pMV-7 (Kirschmeier, P.T. et al., DNA, 7:219-25 (1988)), flanked by the long terminal repeats of the Moloney murine sarcoma virus, is digested with EcoRI and HindIII and subsequently treated with calf intestinal phosphatase. The linear vector is fractionated on agarose gel and purified, using glass beads.

The cDNA encoding a polypeptide of the present invention can be amplified using PCR primers which correspond to the 5' and 3' end sequences respectively as set forth in Example 1 using primers and having appropriate restriction sites and initiation/stop codons, if

necessary. Preferably, the 5' primer contains an EcoRI site and the 3' primer includes a HindIII site. Equal quantities of the Moloney murine sarcoma virus linear backbone and the amplified EcoRI and HindIII fragment are added together, in the presence of T4 DNA ligase. The resulting mixture is maintained under conditions appropriate for ligation of the two fragments. The ligation mixture is then used to transform bacteria HB101, which are then plated onto agar containing kanamycin for the purpose of confirming that the vector has the gene of interest properly inserted.

The amphotropic pA317 or GP+am12 packaging cells are grown in tissue culture to confluent density in Dulbecco's Modified Eagles Medium (DMEM) with 10% calf serum (CS), penicillin and streptomycin. The MSV vector containing the gene is then added to the media and the packaging cells transduced with the vector. The packaging cells now produce infectious viral particles containing the gene (the packaging cells are now referred to as producer cells).

Fresh media is added to the transduced producer cells, and subsequently, the media is harvested from a 10 cm plate of confluent producer cells. The spent media, containing the infectious viral particles, is filtered through a millipore filter to remove detached producer cells and this media is then used to infect fibroblast cells. Media is removed from a sub-confluent plate of fibroblasts and quickly replaced with the media from the producer cells. This media is removed and replaced with fresh media. If the titer of virus is high, then virtually all fibroblasts will be infected and no selection is required. If the titer is very low, then it is necessary to use a retroviral vector that has a selectable marker, such as neo or his. Once the fibroblasts have been efficiently infected, the fibroblasts are analyzed to determine whether protein is produced.

The engineered fibroblasts are then transplanted onto the host, either alone or after having been grown to confluence on cytodex 3 microcarrier beads.

Example 17: Gene Therapy Using Endogenous Genes Corresponding To Polynucleotides of the Invention

Another method of gene therapy according to the present invention involves operably associating the endogenous polynucleotide sequence of the invention with a promoter via homologous recombination as described, for example, in U.S. Patent NO: 5,641,670, issued

June 24, 1997; International Publication NO: WO 96/29411, published September 26, 1996; International Publication NO: WO 94/12650, published August 4, 1994; Koller et al., *Proc. Natl. Acad. Sci. USA*, 86:8932-8935 (1989); and Zijlstra et al., *Nature*, 342:435-438 (1989). This method involves the activation of a gene which is present in the target cells, but which is not expressed in the cells, or is expressed at a lower level than desired.

Polynucleotide constructs are made which contain a promoter and targeting sequences, which are homologous to the 5' non-coding sequence of endogenous polynucleotide sequence, flanking the promoter. The targeting sequence will be sufficiently near the 5' end of the polynucleotide sequence so the promoter will be operably linked to the endogenous sequence upon homologous recombination. The promoter and the targeting sequences can be amplified using PCR. Preferably, the amplified promoter contains distinct restriction enzyme sites on the 5' and 3' ends. Preferably, the 3' end of the first targeting sequence contains the same restriction enzyme site as the 5' end of the amplified promoter and the 5' end of the second targeting sequence contains the same restriction site as the 3' end of the amplified promoter.

The amplified promoter and the amplified targeting sequences are digested with the appropriate restriction enzymes and subsequently treated with calf intestinal phosphatase. The digested promoter and digested targeting sequences are added together in the presence of T4 DNA ligase. The resulting mixture is maintained under conditions appropriate for ligation of the two fragments. The construct is size fractionated on an agarose gel then purified by phenol extraction and ethanol precipitation.

In this Example, the polynucleotide constructs are administered as naked polynucleotides via electroporation. However, the polynucleotide constructs may also be administered with transfection-facilitating agents, such as liposomes, viral sequences, viral particles, precipitating agents, etc. Such methods of delivery are known in the art.

Once the cells are transfected, homologous recombination will take place which results in the promoter being operably linked to the endogenous polynucleotide sequence. This results in the expression of polynucleotide corresponding to the polynucleotide in the cell. Expression may be detected by immunological staining, or any other method known in the art.

Fibroblasts are obtained from a subject by skin biopsy. The resulting tissue is placed in DMEM + 10% fetal calf serum. Exponentially growing or early stationary phase

fibroblasts are trypsinized and rinsed from the plastic surface with nutrient medium. An aliquot of the cell suspension is removed for counting, and the remaining cells are subjected to centrifugation. The supernatant is aspirated and the pellet is resuspended in 5 ml of electroporation buffer (20 mM HEPES pH 7.3, 137 mM NaCl, 5 mM KCl, 0.7 mM Na_2HPO_4, 6 mM dextrose). The cells are recentrifuged, the supernatant aspirated, and the cells resuspended in electroporation buffer containing 1 mg/ml acetylated bovine serum albumin. The final cell suspension contains approximately $3X10^6$ cells/ml. Electroporation should be performed immediately following resuspension.

Plasmid DNA is prepared according to standard techniques. For example, to construct a plasmid for targeting to the locus corresponding to the polynucleotide of the invention, plasmid pUC18 (MBI Fermentas, Amherst, NY) is digested with HindIII. The CMV promoter is amplified by PCR with an XbaI site on the 5' end and a BamHI site on the 3'end. Two non-coding sequences are amplified via PCR: one non-coding sequence (fragment 1) is amplified with a HindIII site at the 5' end and an Xba site at the 3'end; the other non-coding sequence (fragment 2) is amplified with a BamHI site at the 5'end and a HindIII site at the 3'end. The CMV promoter and the fragments (1 and 2) are digested with the appropriate enzymes (CMV promoter - XbaI and BamHI; fragment 1 - XbaI; fragment 2 - BamHI) and ligated together. The resulting ligation product is digested with HindIII, and ligated with the HindIII-digested pUC18 plasmid.

Plasmid DNA is added to a sterile cuvette with a 0.4 cm electrode gap (Bio-Rad). The final DNA concentration is generally at least 120 μg/ml. 0.5 ml of the cell suspension (containing approximately $1.5.X10^6$ cells) is then added to the cuvette, and the cell suspension and DNA solutions are gently mixed. Electroporation is performed with a Gene-Pulser apparatus (Bio-Rad). Capacitance and voltage are set at 960 μF and 250-300 V, respectively. As voltage increases, cell survival decreases, but the percentage of surviving cells that stably incorporate the introduced DNA into their genome increases dramatically. Given these parameters, a pulse time of approximately 14-20 mSec should be observed.

Electroporated cells are maintained at room temperature for approximately 5 min, and the contents of the cuvette are then gently removed with a sterile transfer pipette. The cells are added directly to 10 ml of prewarmed nutrient media (DMEM with 15% calf serum) in a 10 cm dish and incubated at 37 degree C. The following day, the media is aspirated and replaced with 10 ml of fresh media and incubated for a further 16-24 hours.

The engineered fibroblasts are then injected into the host, either alone or after having been grown to confluence on cytodex 3 microcarrier beads. The fibroblasts now produce the protein product. The fibroblasts can then be introduced into a patient as described above.

Example 18: Method of Treatment Using Gene Therapy - In Vivo

Another aspect of the present invention is using *in vivo* gene therapy methods to treat disorders, diseases and conditions. The gene therapy method relates to the introduction of naked nucleic acid (DNA, RNA, and antisense DNA or RNA) sequences into an animal to increase or decrease the expression of the polypeptide. The polynucleotide of the present invention may be operatively linked to a promoter or any other genetic elements necessary for the expression of the polypeptide by the target tissue. Such gene therapy and delivery techniques and methods are known in the art, see, for example, WO90/11092, WO98/11779; U.S. Patent NO. 5693622, 5705151, 5580859; Tabata et al., Cardiovasc. Res. 35(3):470-479 (1997); Chao et al., Pharmacol. Res. 35(6):517-522 (1997); Wolff, Neuromuscul. Disord. 7(5):314-318 (1997); Schwartz et al., Gene Ther. 3(5):405-411 (1996); Tsurumi et al., Circulation 94(12):3281-3290 (1996) (incorporated herein by reference).

The polynucleotide constructs may be delivered by any method that delivers injectable materials to the cells of an animal, such as, injection into the interstitial space of tissues (heart, muscle, skin, lung, liver, intestine and the like). The polynucleotide constructs can be delivered in a pharmaceutically acceptable liquid or aqueous carrier.

The term "naked" polynucleotide, DNA or RNA, refers to sequences that are free from any delivery vehicle that acts to assist, promote, or facilitate entry into the cell, including viral sequences, viral particles, liposome formulations, lipofectin or precipitating agents and the like. However, the polynucleotides of the present invention may also be delivered in liposome formulations (such as those taught in Felgner P.L. et al. (1995) Ann. NY Acad. Sci. 772:126-139 and Abdallah B. et al. (1995) Biol. Cell 85(1):1-7) which can be prepared by methods well known to those skilled in the art.

The polynucleotide vector constructs used in the gene therapy method are preferably constructs that will not integrate into the host genome nor will they contain sequences that allow for replication. Any strong promoter known to those skilled in the art can be used for driving the expression of DNA. Unlike other gene therapies techniques, one major advantage

of introducing naked nucleic acid sequences into target cells is the transitory nature of the polynucleotide synthesis in the cells. Studies have shown that non-replicating DNA sequences can be introduced into cells to provide production of the desired polypeptide for periods of up to six months.

The polynucleotide construct can be delivered to the interstitial space of tissues within the an animal, including of muscle, skin, brain, lung, liver, spleen, bone marrow, thymus, heart, lymph, blood, bone, cartilage, pancreas, kidney, gall bladder, stomach, intestine, testis, ovary, uterus, rectum, nervous system, eye, gland, and connective tissue. Interstitial space of the tissues comprises the intercellular fluid, mucopolysaccharide matrix among the reticular fibers of organ tissues, elastic fibers in the walls of vessels or chambers, collagen fibers of fibrous tissues, or that same matrix within connective tissue ensheathing muscle cells or in the lacunae of bone. It is similarly the space occupied by the plasma of the circulation and the lymph fluid of the lymphatic channels. Delivery to the interstitial space of muscle tissue is preferred for the reasons discussed below. They may be conveniently delivered by injection into the tissues comprising these cells. They are preferably delivered to and expressed in persistent, non-dividing cells which are differentiated, although delivery and expression may be achieved in non-differentiated or less completely differentiated cells, such as, for example, stem cells of blood or skin fibroblasts. *In vivo* muscle cells are particularly competent in their ability to take up and express polynucleotides.

For the naked polynucleotide injection, an effective dosage amount of DNA or RNA will be in the range of from about 0.05 g/kg body weight to about 50 mg/kg body weight. Preferably the dosage will be from about 0.005 mg/kg to about 20 mg/kg and more preferably from about 0.05 mg/kg to about 5 mg/kg. Of course, as the artisan of ordinary skill will appreciate, this dosage will vary according to the tissue site of injection. The appropriate and effective dosage of nucleic acid sequence can readily be determined by those of ordinary skill in the art and may depend on the condition being treated and the route of administration. The preferred route of administration is by the parenteral route of injection into the interstitial space of tissues. However, other parenteral routes may also be used, such as, inhalation of an aerosol formulation particularly for delivery to lungs or bronchial tissues, throat or mucous membranes of the nose. In addition, naked polynucleotide constructs can be delivered to arteries during angioplasty by the catheter used in the procedure.

The dose response effects of injected polynucleotide in muscle *in vivo* is determined

as follows. Suitable template DNA for production of mRNA coding for polypeptide of the present invention is prepared in accordance with a standard recombinant DNA methodology. The template DNA, which may be either circular or linear, is either used as naked DNA or complexed with liposomes. The quadriceps muscles of mice are then injected with various amounts of the template DNA.

Five to six week old female and male Balb/C mice are anesthetized by intraperitoneal injection with 0.3 ml of 2.5% Avertin. A 1.5 cm incision is made on the anterior thigh, and the quadriceps muscle is directly visualized. The template DNA is injected in 0.1 ml of carrier in a 1 cc syringe through a 27 gauge needle over one minute, approximately 0.5 cm from the distal insertion site of the muscle into the knee and about 0.2 cm deep. A suture is placed over the injection site for future localization, and the skin is closed with stainless steel clips.

After an appropriate incubation time (e.g., 7 days) muscle extracts are prepared by excising the entire quadriceps. Every fifth 15 um cross-section of the individual quadriceps muscles is histochemically stained for protein expression. A time course for protein expression may be done in a similar fashion except that quadriceps from different mice are harvested at different times. Persistence of DNA in muscle following injection may be determined by Southern blot analysis after preparing total cellular DNA and HIRT supernatants from injected and control mice. The results of the above experimentation in mice can be use to extrapolate proper dosages and other treatment parameters in humans and other animals using naked DNA.

Example 19: Transgenic Animals

The polypeptides of the invention can also be expressed in transgenic animals. Animals of any species, including, but not limited to, mice, rats, rabbits, hamsters, guinea pigs, pigs, micro-pigs, goats, sheep, cows and non-human primates, *e.g.*, baboons, monkeys, and chimpanzees may be used to generate transgenic animals. In a specific embodiment, techniques described herein or otherwise known in the art, are used to express polypeptides of the invention in humans, as part of a gene therapy protocol.

Any technique known in the art may be used to introduce the transgene (i.e., polynucleotides of the invention) into animals to produce the founder lines of transgenic

animals. Such techniques include, but are not limited to, pronuclear microinjection (Paterson et al., Appl. Microbiol. Biotechnol. 40:691-698 (1994); Carver et al., Biotechnology (NY) 11:1263-1270 (1993); Wright et al., Biotechnology (NY) 9:830-834 (1991); and Hoppe et al., U.S. Pat. No. 4,873,191 (1989)); retrovirus mediated gene transfer into germ lines (Van der Putten et al., Proc. Natl. Acad. Sci., USA 82:6148-6152 (1985)), blastocysts or embryos; gene targeting in embryonic stem cells (Thompson et al., Cell 56:313-321 (1989)); electroporation of cells or embryos (Lo, 1983, Mol Cell. Biol. 3:1803-1814 (1983)); introduction of the polynucleotides of the invention using a gene gun (see, e.g., Ulmer et al., Science 259:1745 (1993); introducing nucleic acid constructs into embryonic pleuripotent stem cells and transferring the stem cells back into the blastocyst; and sperm-mediated gene transfer (Lavitrano et al., Cell 57:717-723 (1989); etc. For a review of such techniques, see Gordon, "Transgenic Animals," Intl. Rev. Cytol. 115:171-229 (1989), which is incorporated by reference herein in its entirety.

Any technique known in the art may be used to produce transgenic clones containing polynucleotides of the invention, for example, nuclear transfer into enucleated oocytes of nuclei from cultured embryonic, fetal, or adult cells induced to quiescence (Campell et al., Nature 380:64-66 (1996); Wilmut et al., Nature 385:810-813 (1997)).

The present invention provides for transgenic animals that carry the transgene in all their cells, as well as animals which carry the transgene in some, but not all their cells, *i.e.*, mosaic animals or chimeric. The transgene may be integrated as a single transgene or as multiple copies such as in concatamers, *e.g.*, head-to-head tandems or head-to-tail tandems. The transgene may also be selectively introduced into and activated in a particular cell type by following, for example, the teaching of Lasko et al. (Lasko et al., Proc. Natl. Acad. Sci. USA 89:6232-6236 (1992)). The regulatory sequences required for such a cell-type specific activation will depend upon the particular cell type of interest, and will be apparent to those of skill in the art. When it is desired that the polynucleotide transgene be integrated into the chromosomal site of the endogenous gene, gene targeting is preferred. Briefly, when such a technique is to be utilized, vectors containing some nucleotide sequences homologous to the endogenous gene are designed for the purpose of integrating, via homologous recombination with chromosomal sequences, into and disrupting the function of the nucleotide sequence of the endogenous gene. The transgene may also be selectively introduced into a particular cell type, thus inactivating the endogenous gene in only that cell type, by following, for example,

the teaching of Gu et al. (Gu et al.. Science 265:103-106 (1994)). The regulatory sequences required for such a cell-type specific inactivation will depend upon the particular cell type of interest. and will be apparent to those of skill in the art.

Once transgenic animals have been generated. the expression of the recombinant gene may be assayed utilizing standard techniques. Initial screening may be accomplished by Southern blot analysis or PCR techniques to analyze animal tissues to verify that integration of the transgene has taken place. The level of mRNA expression of the transgene in the tissues of the transgenic animals may also be assessed using techniques which include, but are not limited to, Northern blot analysis of tissue samples obtained from the animal, *in situ* hybridization analysis, and reverse transcriptase-PCR (rt-PCR). Samples of transgenic gene-expressing tissue may also be evaluated immunocytochemically or immunohistochemically using antibodies specific for the transgene product.

Once the founder animals are produced, they may be bred, inbred, outbred, or crossbred to produce colonies of the particular animal. Examples of such breeding strategies include, but are not limited to: outbreeding of founder animals with more than one integration site in order to establish separate lines; inbreeding of separate lines in order to produce compound transgenics that express the transgene at higher levels because of the effects of additive expression of each transgene; crossing of heterozygous transgenic animals to produce animals homozygous for a given integration site in order to both augment expression and eliminate the need for screening of animals by DNA analysis; crossing of separate homozygous lines to produce compound heterozygous or homozygous lines; and breeding to place the transgene on a distinct background that is appropriate for an experimental model of interest.

Transgenic animals of the invention have uses which include, but are not limited to, animal model systems useful in elaborating the biological function of polypeptides of the present invention, studying conditions and/or disorders associated with aberrant expression, and in screening for compounds effective in ameliorating such conditions and/or disorders.

Example 20: Knock-Out Animals

Endogenous gene expression can also be reduced by inactivating or "knocking out" the gene and/or its promoter using targeted homologous recombination. (*E.g.*, see Smithies

et al.. Nature 317:230-234 (1985); Thomas & Capecchi, Cell 51:503-512 (1987); Thompson et al., Cell 5:313-321 (1989); each of which is incorporated by reference herein in its entirety). For example, a mutant, non-functional polynucleotide of the invention (or a completely unrelated DNA sequence) flanked by DNA homologous to the endogenous polynucleotide sequence (either the coding regions or regulatory regions of the gene) can be used, with or without a selectable marker and/or a negative selectable marker, to transfect cells that express polypeptides of the invention *in vivo*. In another embodiment, techniques known in the art are used to generate knockouts in cells that contain, but do not express the gene of interest. Insertion of the DNA construct, via targeted homologous recombination, results in inactivation of the targeted gene. Such approaches are particularly suited in research and agricultural fields where modifications to embryonic stem cells can be used to generate animal offspring with an inactive targeted gene (*e.g.*, see Thomas & Capecchi 1987 and Thompson 1989, *supra*). However this approach can be routinely adapted for use in humans provided the recombinant DNA constructs are directly administered or targeted to the required site *in vivo* using appropriate viral vectors that will be apparent to those of skill in the art.

In further embodiments of the invention, cells that are genetically engineered to express the polypeptides of the invention, or alternatively, that are genetically engineered not to express the polypeptides of the invention (e.g., knockouts) are administered to a patient *in vivo*. Such cells may be obtained from the patient (i.e., animal, including human) or an MHC compatible donor and can include, but are not limited to fibroblasts, bone marrow cells, blood cells (e.g., lymphocytes), adipocytes, muscle cells, endothelial cells etc. The cells are genetically engineered *in vitro* using recombinant DNA techniques to introduce the coding sequence of polypeptides of the invention into the cells, or alternatively, to disrupt the coding sequence and/or endogenous regulatory sequence associated with the polypeptides of the invention, e.g., by transduction (using viral vectors, and preferably vectors that integrate the transgene into the cell genome) or transfection procedures, including, but not limited to, the use of plasmids, cosmids, YACs, naked DNA, electroporation, liposomes, etc. The coding sequence of the polypeptides of the invention can be placed under the control of a strong constitutive or inducible promoter or promoter/enhancer to achieve expression, and preferably secretion, of the polypeptides of the invention. The engineered cells which express and preferably secrete the polypeptides of the invention can be introduced into the

patient systemically. e.g., in the circulation, or intraperitoneally.

Alternatively, the cells can be incorporated into a matrix and implanted in the body, e.g., genetically engineered fibroblasts can be implanted as part of a skin graft; genetically engineered endothelial cells can be implanted as part of a lymphatic or vascular graft. (See, for example, Anderson et al. U.S. Patent No. 5,399,349; and Mulligan & Wilson, U.S. Patent No. 5,460,959 each of which is incorporated by reference herein in its entirety).

When the cells to be administered are non-autologous or non-MHC compatible cells, they can be administered using well known techniques which prevent the development of a host immune response against the introduced cells. For example, the cells may be introduced in an encapsulated form which, while allowing for an exchange of components with the immediate extracellular environment, does not allow the introduced cells to be recognized by the host immune system.

Transgenic and "knock-out" animals of the invention have uses which include, but are not limited to, animal model systems useful in elaborating the biological function of polypeptides of the present invention, studying conditions and/or disorders associated with aberrant expression, and in screening for compounds effective in ameliorating such conditions and/or disorders.

Example 22: Assays Detecting Stimulation or Inhibition of B cell Proliferation and Differentiation

Generation of functional humoral immune responses requires both soluble and cognate signaling between B-lineage cells and their microenvironment. Signals may impart a positive stimulus that allows a B-lineage cell to continue its programmed development, or a negative stimulus that instructs the cell to arrest its current developmental pathway. To date, numerous stimulatory and inhibitory signals have been found to influence B cell responsiveness including IL-2, IL-4, IL-5, IL-6, IL-7, IL10, IL-13, IL-14 and IL-15. Interestingly, these signals are by themselves weak effectors but can, in combination with various co-stimulatory proteins, induce activation, proliferation, differentiation, homing, tolerance and death among B cell populations.

One of the best studied classes of B-cell co-stimulatory proteins is the TNF-superfamily. Within this family CD40, CD27, and CD30 along with their respective ligands

CD154, CD70, and CD153 have been found to regulate a variety of immune responses. Assays which allow for the detection and/or observation of the proliferation and differentiation of these B-cell populations and their precursors are valuable tools in determining the effects various proteins may have on these B-cell populations in terms of proliferation and differentiation. Listed below are two assays designed to allow for the detection of the differentiation, proliferation, or inhibition of B-cell populations and their precursors.

In Vitro Assay- Agonists or antagonists of the invention can be assessed for its ability to induce activation, proliferation, differentiation or inhibition and/or death in B-cell populations and their precursors. The activity of the agonists or antagonists of the invention on purified human tonsillar B cells, measured qualitatively over the dose range from 0.1 to 10,000 ng/mL, is assessed in a standard B-lymphocyte co-stimulation assay in which purified tonsillar B cells are cultured in the presence of either formalin-fixed Staphylococcus aureus Cowan I (SAC) or immobilized anti-human IgM antibody as the priming agent. Second signals such as IL-2 and IL-15 synergize with SAC and IgM crosslinking to elicit B cell proliferation as measured by tritiated-thymidine incorporation. Novel synergizing agents can be readily identified using this assay. The assay involves isolating human tonsillar B cells by magnetic bead (MACS) depletion of CD3-positive cells. The resulting cell population is greater than 95% B cells as assessed by expression of CD45R(B220).

Various dilutions of each sample are placed into individual wells of a 96-well plate to which are added 10^5 B-cells suspended in culture medium (RPMI 1640 containing 10% FBS, 5 X 10^{-5}M 2ME, 100U/ml penicillin, 10ug/ml streptomycin, and 10^{-5} dilution of SAC) in a total volume of 150ul. Proliferation or inhibition is quantitated by a 20h pulse (1uCi/well) with 3H-thymidine (6.7 Ci/mM) beginning 72h post factor addition. The positive and negative controls are IL2 and medium respectively.

In Vivo Assay- BALB/c mice are injected (i.p.) twice per day with buffer only, or 2 mg/Kg of agonists or antagonists of the invention, or truncated forms thereof. Mice receive this treatment for 4 consecutive days, at which time they are sacrificed and various tissues and serum collected for analyses. Comparison of H&E sections from normal spleens and spleens treated with agonists or antagonists of the invention identify the results of the activity of the agonists or antagonists on spleen cells, such as the diffusion of peri-arterial lymphatic sheaths, and/or significant increases in the nucleated cellularity of the red pulp regions, which

may indicate the activation of the differentiation and proliferation of B-cell populations. Immunohistochemical studies using a B cell marker, anti-CD45R(B220), are used to determine whether any physiological changes to splenic cells, such as splenic disorganization, are due to increased B-cell representation within loosely defined B-cell zones that infiltrate established T-cell regions.

Flow cytometric analyses of the spleens from mice treated with agonist or antagonist is used to indicate whether the agonists or antagonists specifically increases the proportion of ThB+, CD45R(B220)dull B cells over that which is observed in control mice.

Likewise, a predicted consequence of increased mature B-cell representation in vivo is a relative increase in serum Ig titers. Accordingly, serum IgM and IgA levels are compared between buffer and agonists or antagonists-treated mice.

The studies described in this example tested activity of agonists or antagonists of the invention. However, one skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 23: T Cell Proliferation Assay

A CD3-induced proliferation assay is performed on PBMCs and is measured by the uptake of ^{3}H-thymidine. The assay is performed as follows. Ninety-six well plates are coated with 100 µl/well of mAb to CD3 (HIT3a, Pharmingen) or isotype-matched control mAb (B33.1) overnight at 4 degrees C (1 µg/ml in .05M bicarbonate buffer, pH 9.5), then washed three times with PBS. PBMC are isolated by F/H gradient centrifugation from human peripheral blood and added to quadruplicate wells (5 x 10^4/well) of mAb coated plates in RPMI containing 10% FCS and P/S in the presence of varying concentrations of agonists or antagonists of the invention (total volume 200 ul). Relevant protein buffer and medium alone are controls. After 48 hr. culture at 37 degrees C, plates are spun for 2 min. at 1000 rpm and 100 µl of supernatant is removed and stored –20 degrees C for measurement of IL-2 (or other cytokines) if effect on proliferation is observed. Wells are supplemented with 100 ul of medium containing 0.5 uCi of ^{3}H-thymidine and cultured at 37 degrees C for 18-24 hr. Wells are harvested and incorporation of ^{3}H-thymidine used as a measure of proliferation. Anti-CD3 alone is the positive control for proliferation. IL-2 (100 U/ml) is also used as a control which enhances proliferation. Control antibody which does not induce proliferation

of T cells is used as the negative controls for the effects of agonists or antagonists of the invention.

The studies described in this example tested activity of agonists or antagonists of the invention. However. one skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 24: Effect of Agonists or Antagonists of the Invention on the Expression of MHC Class II, Costimulatory and Adhesion Molecules and Cell Differentiation of Monocytes and Monocyte-Derived Human Dendritic Cells

Dendritic cells are generated by the expansion of proliferating precursors found in the peripheral blood: adherent PBMC or elutriated monocytic fractions are cultured for 7-10 days with GM-CSF (50 ng/ml) and IL-4 (20 ng/ml). These dendritic cells have the characteristic phenotype of immature cells (expression of CD1, CD80, CD86, CD40 and MHC class II antigens). Treatment with activating factors, such as TNF-α, causes a rapid change in surface phenotype (increased expression of MHC class I and II, costimulatory and adhesion molecules, downregulation of FCγRII, upregulation of CD83). These changes correlate with increased antigen-presenting capacity and with functional maturation of the dendritic cells.

FACS analysis of surface antigens is performed as follows. Cells are treated 1-3 days with increasing concentrations of agonist or antagonist of the invention or LPS (positive control), washed with PBS containing 1% BSA and 0.02 mM sodium azide, and then incubated with 1:20 dilution of appropriate FITC- or PE-labeled monoclonal antibodies for 30 minutes at 4 degrees C. After an additional wash, the labeled cells are analyzed by flow cytometry on a FACScan (Becton Dickinson).

Effect on the production of cytokines. Cytokines generated by dendritic cells, in particular IL-12, are important in the initiation of T-cell dependent immune responses. IL-12 strongly influences the development of Thl helper T-cell immune response, and induces cytotoxic T and NK cell function. An ELISA is used to measure the IL-12 release as follows. Dendritic cells (10^6/ml) are treated with increasing concentrations of agonists or antagonists of the invention for 24 hours. LPS (100 ng/ml) is added to the cell culture as positive control. Supernatants from the cell cultures are then collected and analyzed for IL-12 content using

commercial ELISA kit (e..g, R & D Systems (Minneapolis. MN)). The standard protocols provided with the kits are used.

Effect on the expression of MHC Class II, costimulatory and adhesion molecules. Three major families of cell surface antigens can be identified on monocytes: adhesion molecules, molecules involved in antigen presentation. and Fc receptor. Modulation of the expression of MHC class II antigens and other costimulatory molecules, such as B7 and ICAM-1, may result in changes in the antigen presenting capacity of monocytes and ability to induce T cell activation. Increase expression of Fc receptors may correlate with improved monocyte cytotoxic activity, cytokine release and phagocytosis.

FACS analysis is used to examine the surface antigens as follows. Monocytes are treated 1-5 days with increasing concentrations of agonists or antagonists of the invention or LPS (positive control), washed with PBS containing 1% BSA and 0.02 mM sodium azide, and then incubated with 1:20 dilution of appropriate FITC- or PE-labeled monoclonal antibodies for 30 minutes at 4 degreesC. After an additional wash, the labeled cells are analyzed by flow cytometry on a FACScan (Becton Dickinson).

Monocyte activation and/or increased survival. Assays for molecules that activate (or alternatively, inactivate) monocytes and/or increase monocyte survival (or alternatively, decrease monocyte survival) are known in the art and may routinely be applied to determine whether a molecule of the invention functions as an inhibitor or activator of monocytes. Agonists or antagonists of the invention can be screened using the three assays described below. For each of these assays, Peripheral blood mononuclear cells (PBMC) are purified from single donor leukopacks (American Red Cross, Baltimore, MD) by centrifugation through a Histopaque gradient (Sigma). Monocytes are isolated from PBMC by counterflow centrifugal elutriation.

Monocyte Survival Assay. Human peripheral blood monocytes progressively lose viability when cultured in absence of serum or other stimuli. Their death results from internally regulated process (apoptosis). Addition to the culture of activating factors, such as TNF-alpha dramatically improves cell survival and prevents DNA fragmentation. Propidium iodide (PI) staining is used to measure apoptosis as follows. Monocytes are cultured for 48 hours in

polypropylene tubes in serum-free medium (positive control), in the presence of 100 ng/ml TNF-alpha (negative control), and in the presence of varying concentrations of the compound to be tested. Cells are suspended at a concentration of 2 x 10^6/ml in PBS containing PI at a final concentration of 5 μg/ml, and then incubaed at room temperature for 5 minutes before FACScan analysis. PI uptake has been demonstrated to correlate with DNA fragmentation in this experimental paradigm.

Effect on cytokine release. An important function of monocytes/macrophages is their regulatory activity on other cellular populations of the immune system through the release of cytokines after stimulation. An ELISA to measure cytokine release is performed as follows. Human monocytes are incubated at a density of $5x10^5$ cells/ml with increasing concentrations of agonists or antagonists of the invention and under the same conditions, but in the absence of agonists or antagonists. For IL-12 production, the cells are primed overnight with IFN (100 U/ml) in presence of agonist or antagonist of the invention. LPS (10 ng/ml) is then added. Conditioned media are collected after 24h and kept frozen until use. Measurement of TNF-alpha, IL-10, MCP-1 and IL-8 is then performed using a commercially available ELISA kit (e. g, R & D Systems (Minneapolis, MN)) and applying the standard protocols provided with the kit.

Oxidative burst. Purified monocytes are plated in 96-w plate at $2\text{-}1x10^5$ cell/well. Increasing concentrations of agonists or antagonists of the invention are added to the wells in a total volume of 0.2 ml culture medium (RPMI 1640 + 10% FCS, glutamine and antibiotics). After 3 days incubation, the plates are centrifuged and the medium is removed from the wells. To the macrophage monolayers, 0.2 ml per well of phenol red solution (140 mM NaCl, 10 mM potassium phosphate buffer pH 7.0, 5.5 mM dextrose, 0.56 mM phenol red and 19 U/ml of HRPO) is added, together with the stimulant (200 nM PMA). The plates are incubated at 37°C for 2 hours and the reaction is stopped by adding 20 μl 1N NaOH per well. The absorbance is read at 610 nm. To calculate the amount of H_2O_2 produced by the macrophages. a standard curve of a H_2O_2 solution of known molarity is performed for each experiment.

The studies described in this example tested activity of agonists or antagonists of the invention. However, one skilled in the art could easily modify the exemplified studies to test

the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 25: Biological Effects of Agonists or Antagonists of the Invention

Astrocyte and Neuronal Assays.

Agonists or antagonists of the invention, expressed in *Escherichia coli* and purified as described above, can be tested for activity in promoting the survival, neurite outgrowth, or phenotypic differentiation of cortical neuronal cells and for inducing the proliferation of glial fibrillary acidic protein immunopositive cells, astrocytes. The selection of cortical cells for the bioassay is based on the prevalent expression of FGF-1 and FGF-2 in cortical structures and on the previously reported enhancement of cortical neuronal survival resulting from FGF-2 treatment. A thymidine incorporation assay, for example, can be used to elucidate an agonist or antagonist of the invention's activity on these cells.

Moreover, previous reports describing the biological effects of FGF-2 (basic FGF) on cortical or hippocampal neurons *in vitro* have demonstrated increases in both neuron survival and neurite outgrowth (Walicke et al., "Fibroblast growth factor promotes survival of dissociated hippocampal neurons and enhances neurite extension." *Proc. Natl. Acad. Sci. USA 83*:3012-3016. (1986), assay herein incorporated by reference in its entirety). However, reports from experiments done on PC-12 cells suggest that these two responses are not necessarily synonymous and may depend on not only which FGF is being tested but also on which receptor(s) are expressed on the target cells. Using the primary cortical neuronal culture paradigm, the ability of an agonist or antagonist of the invention to induce neurite outgrowth can be compared to the response achieved with FGF-2 using, for example, a thymidine incorporation assay.

Fibroblast and endothelial cell assays.

Human lung fibroblasts are obtained from Clonetics (San Diego, CA) and maintained in growth media from Clonetics. Dermal microvascular endothelial cells are obtained from Cell Applications (San Diego, CA). For proliferation assays, the human lung fibroblasts and

dermal microvascular endothelial cells can be cultured at 5,000 cells/well in a 96-well plate for one day in growth medium. The cells are then incubated for one day in 0.1% BSA basal medium. After replacing the medium with fresh 0.1% BSA medium, the cells are incubated with the test proteins for 3 days. Alamar Blue (Alamar Biosciences, Sacramento, CA) is added to each well to a final concentration of 10%. The cells are incubated for 4 hr. Cell viability is measured by reading in a CytoFluor fluorescence reader. For the PGE_2 assays, the human lung fibroblasts are cultured at 5,000 cells/well in a 96-well plate for one day. After a medium change to 0.1% BSA basal medium, the cells are incubated with FGF-2 or agonists or antagonists of the invention with or without IL-1α for 24 hours. The supernatants are collected and assayed for PGE_2 by EIA kit (Cayman, Ann Arbor, MI). For the IL-6 assays, the human lung fibroblasts are cultured at 5,000 cells/well in a 96-well plate for one day. After a medium change to 0.1% BSA basal medium, the cells are incubated with FGF-2 or with or without agonists or antagonists of the invention IL-1α for 24 hours. The supernatants are collected and assayed for IL-6 by ELISA kit (Endogen, Cambridge, MA).

Human lung fibroblasts are cultured with FGF-2 or agonists or antagonists of the invention for 3 days in basal medium before the addition of Alamar Blue to assess effects on growth of the fibroblasts. FGF-2 should show a stimulation at 10 - 2500 ng/ml which can be used to compare stimulation with agonists or antagonists of the invention.

Parkinson Models.

The loss of motor function in Parkinson's disease is attributed to a deficiency of striatal dopamine resulting from the degeneration of the nigrostriatal dopaminergic projection neurons. An animal model for Parkinson's that has been extensively characterized involves the systemic administration of 1-methyl-4 phenyl 1,2,3,6-tetrahydropyridine (MPTP). In the CNS, MPTP is taken-up by astrocytes and catabolized by monoamine oxidase B to 1-methyl-4-phenyl pyridine (MPP^+) and released. Subsequently, MPP^+ is actively accumulated in dopaminergic neurons by the high-affinity reuptake transporter for dopamine. MPP^+ is then concentrated in mitochondria by the electrochemical gradient and selectively inhibits nicotidamide adenine disphosphate: ubiquinone oxidoreductionase (complex I), thereby interfering with electron transport and eventually generating oxygen radicals.

It has been demonstrated in tissue culture paradigms that FGF-2 (basic FGF) has

trophic activity towards nigral dopaminergic neurons (Ferrari et al., Dev. Biol. 1989). Recently, Dr. Unsicker's group has demonstrated that administering FGF-2 in gel foam implants in the striatum results in the near complete protection of nigral dopaminergic neurons from the toxicity associated with MPTP exposure (Otto and Unsicker, J. Neuroscience, 1990).

Based on the data with FGF-2, agonists or antagonists of the invention can be evaluated to determine whether it has an action similar to that of FGF-2 in enhancing dopaminergic neuronal survival *in vitro* and it can also be tested *in vivo* for protection of dopaminergic neurons in the striatum from the damage associated with MPTP treatment. The potential effect of an agonist or antagonist of the invention is first examined in vitro in a dopaminergic neuronal cell culture paradigm. The cultures are prepared by dissecting the midbrain floor plate from gestation day 14 Wistar rat embryos. The tissue is dissociated with trypsin and seeded at a density of 200,000 cells/cm^2 on polyorthinine-laminin coated glass coverslips. The cells are maintained in Dulbecco's Modified Eagle's medium and F12 medium containing hormonal supplements (N1). The cultures are fixed with paraformaldehyde after 8 days in vitro and are processed for tyrosine hydroxylase, a specific marker for dopminergic neurons, immunohistochemical staining. Dissociated cell cultures are prepared from embryonic rats. The culture medium is changed every third day and the factors are also added at that time.

Since the dopaminergic neurons are isolated from animals at gestation day 14, a developmental time which is past the stage when the dopaminergic precursor cells are proliferating, an increase in the number of tyrosine hydroxylase immunopositive neurons would represent an increase in the number of dopaminergic neurons surviving *in vitro*. Therefore, if an agonist or antagonist of the invention acts to prolong the survival of dopaminergic neurons, it would suggest that the agonist or antagonist may be involved in Parkinson's Disease.

The studies described in this example tested activity of agonists or antagonists of the invention. However, one skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 26: The Effect of Agonists or Antagonists of the Invention on the Growth of

Vascular Endothelial Cells

On day 1, human umbilical vein endothelial cells (HUVEC) are seeded at 2-5x10^4 cells/35 mm dish density in M199 medium containing 4% fetal bovine serum (FBS), 16 units/ml heparin, and 50 units/ml endothelial cell growth supplements (ECGS, Biotechnique, Inc.). On day 2, the medium is replaced with M199 containing 10% FBS, 8 units/ml heparin. An agonist or antagonist of the invention, and positive controls, such as VEGF and basic FGF (bFGF) are added, at varying concentrations. On days 4 and 6, the medium is replaced. On day 8, cell number is determined with a Coulter Counter.

An increase in the number of HUVEC cells indicates that the compound of the invention may proliferate vascular endothelial cells, while a decrease in the number of HUVEC cell indicates that the compound of the invention inhibits vascular endothelial cells.

The studies described in this example tested activity of a polypeptide of the invention. However, one skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides (e.g., gene therapy), agonists, and/or antagonists of the invention.

Example 27: Rat Corneal Wound Healing Model

This animal model shows the effect of an agonist or antagonist of the invention on neovascularization. The experimental protocol includes:

a) Making a 1-1.5 mm long incision from the center of cornea into the stromal layer.

b) Inserting a spatula below the lip of the incision facing the outer corner of the eye.

c) Making a pocket (its base is 1-1.5 mm form the edge of the eye).

d) Positioning a pellet, containing 50ng- 5ug of an agonist or antagonist of the invention, within the pocket.

e) Treatment with an agonist or antagonist of the invention can also be applied topically to the corneal wounds in a dosage range of 20mg - 500mg (daily treatment for five days).

The studies described in this example tested activity of agonists or antagonists of the invention. However, one skilled in the art could easily modify the exemplified studies to test

the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 28: Diabetic Mouse and Glucocorticoid-Impaired Wound Healing Models

A. Diabetic db+/db+ Mouse Model.

To demonstrate that an agonist or antagonist of the invention accelerates the healing process, the genetically diabetic mouse model of wound healing is used. The full thickness wound healing model in the db+/db+ mouse is a well characterized, clinically relevant and reproducible model of impaired wound healing. Healing of the diabetic wound is dependent on formation of granulation tissue and re-epithelialization rather than contraction (Gartner, M.H. *et al., J. Surg. Res.* *52*:389 (1992); Greenhalgh, D.G. *et al., Am. J. Pathol.* *136*:1235 (1990)).

The diabetic animals have many of the characteristic features observed in Type II diabetes mellitus. Homozygous (db+/db+) mice are obese in comparison to their normal heterozygous (db+/+m) littermates. Mutant diabetic (db+/db+) mice have a single autosomal recessive mutation on chromosome 4 (db+) (Coleman *et al. Proc. Natl. Acad. Sci. USA* *77*:283-293 (1982)). Animals show polyphagia, polydipsia and polyuria. Mutant diabetic mice (db+/db+) have elevated blood glucose, increased or normal insulin levels, and suppressed cell-mediated immunity (Mandel *et al., J. Immunol.* *120*:1375 (1978); Debray-Sachs, M. *et al., Clin. Exp. Immunol.* *51(1)*:1-7 (1983); Leiter *et al., Am. J. of Pathol.* *114*:46-55 (1985)). Peripheral neuropathy, myocardial complications, and microvascular lesions, basement membrane thickening and glomerular filtration abnormalities have been described in these animals (Norido, F. *et al., Exp. Neurol.* *83(2)*:221-232 (1984); Robertson *et al., Diabetes* *29(1)*:60-67 (1980); Giacomelli *et al., Lab Invest.* *40(4)*:460-473 (1979); Coleman, D.L., *Diabetes* *31 (Suppl)*:1-6 (1982)). These homozygous diabetic mice develop hyperglycemia that is resistant to insulin analogous to human type II diabetes (Mandel *et al., J. Immunol.* *120*:1375-1377 (1978)).

The characteristics observed in these animals suggests that healing in this model may be similar to the healing observed in human diabetes (Greenhalgh, *et al., Am. J. of Pathol.* *136*:1235-1246 (1990)).

Genetically diabetic female C57BL/KsJ (db+/db+) mice and their non-diabetic (db+/+m) heterozygous littermates are used in this study (Jackson Laboratories). The

animals are purchased at 6 weeks of age and are 8 weeks old at the beginning of the study. Animals are individually housed and received food and water ad libitum. All manipulations are performed using aseptic techniques. The experiments are conducted according to the rules and guidelines of Human Genome Sciences, Inc. Institutional Animal Care and Use Committee and the Guidelines for the Care and Use of Laboratory Animals.

Wounding protocol is performed according to previously reported methods (Tsuboi, R. and Rifkin, D.B., *J. Exp. Med. 172*:245-251 (1990)). Briefly, on the day of wounding, animals are anesthetized with an intraperitoneal injection of Avertin (0.01 mg/mL), 2,2,2-tribromoethanol and 2-methyl-2-butanol dissolved in deionized water. The dorsal region of the animal is shaved and the skin washed with 70% ethanol solution and iodine. The surgical area is dried with sterile gauze prior to wounding. An 8 mm full-thickness wound is then created using a Keyes tissue punch. Immediately following wounding, the surrounding skin is gently stretched to eliminate wound expansion. The wounds are left open for the duration of the experiment. Application of the treatment is given topically for 5 consecutive days commencing on the day of wounding. Prior to treatment, wounds are gently cleansed with sterile saline and gauze sponges.

Wounds are visually examined and photographed at a fixed distance at the day of surgery and at two day intervals thereafter. Wound closure is determined by daily measurement on days 1-5 and on day 8. Wounds are measured horizontally and vertically using a calibrated Jameson caliper. Wounds are considered healed if granulation tissue is no longer visible and the wound is covered by a continuous epithelium.

An agonist or antagonist of the invention is administered using at a range different doses, from 4mg to 500mg per wound per day for 8 days in vehicle. Vehicle control groups received 50mL of vehicle solution.

Animals are euthanized on day 8 with an intraperitoneal injection of sodium pentobarbital (300mg/kg). The wounds and surrounding skin are then harvested for histology and immunohistochemistry. Tissue specimens are placed in 10% neutral buffered formalin in tissue cassettes between biopsy sponges for further processing.

Three groups of 10 animals each (5 diabetic and 5 non-diabetic controls) are evaluated: 1) Vehicle placebo control, 2) untreated group, and 3) treated group.

Wound closure is analyzed by measuring the area in the vertical and horizontal axis and obtaining the total square area of the wound. Contraction is then estimated by establishing

the differences between the initial wound area (day 0) and that of post treatment (day 8). The wound area on day 1 is $64mm^2$, the corresponding size of the dermal punch. Calculations are made using the following formula:

[Open area on day 8] - [Open area on day 1] / [Open area on day 1]

Specimens are fixed in 10% buffered formalin and paraffin embedded blocks are sectioned perpendicular to the wound surface (5mm) and cut using a Reichert-Jung microtome. Routine hematoxylin-eosin (H&E) staining is performed on cross-sections of bisected wounds. Histologic examination of the wounds are used to assess whether the healing process and the morphologic appearance of the repaired skin is altered by treatment with an agonist or antagonist of the invention. This assessment included verification of the presence of cell accumulation, inflammatory cells, capillaries, fibroblasts, re-epithelialization and epidermal maturity (Greenhalgh, D.G. *et al., Am. J. Pathol. 136:*1235 (1990)). A calibrated lens micrometer is used by a blinded observer.

Tissue sections are also stained immunohistochemically with a polyclonal rabbit anti-human keratin antibody using ABC Elite detection system. Human skin is used as a positive tissue control while non-immune IgG is used as a negative control. Keratinocyte growth is determined by evaluating the extent of reepithelialization of the wound using a calibrated lens micrometer.

Proliferating cell nuclear antigen/cyclin (PCNA) in skin specimens is demonstrated by using anti-PCNA antibody (1:50) with an ABC Elite detection system. Human colon cancer served as a positive tissue control and human brain tissue is used as a negative tissue control. Each specimen included a section with omission of the primary antibody and substitution with non-immune mouse IgG. Ranking of these sections is based on the extent of proliferation on a scale of 0-8, the lower side of the scale reflecting slight proliferation to the higher side reflecting intense proliferation.

Experimental data are analyzed using an unpaired t test. A p value of < 0.05 is considered significant.

B. Steroid Impaired Rat Model

The inhibition of wound healing by steroids has been well documented in various *in vitro* and

in vivo systems (Wahl, Glucocorticoids and Wound healing. In: Anti-Inflammatory Steroid Action: Basic and Clinical Aspects. 280-302 (1989); Wahl*et al.*, *J. Immunol. 115*: 476-481 (1975); Werb *et al.*, *J. Exp. Med. 147*:1684-1694 (1978)). Glucocorticoids retard wound healing by inhibiting angiogenesis, decreasing vascular permeability (Ebert *et al.*, *An. Intern. Med. 37*:701-705 (1952)), fibroblast proliferation, and collagen synthesis (Beck *et al.*, *Growth Factors. 5:* 295-304 (1991); Haynes *et al.*, *J. Clin. Invest. 61:* 703-797 (1978)) and producing a transient reduction of circulating monocytes (Haynes et al., *J. Clin. Invest. 61:* 703-797 (1978); Wahl, "Glucocorticoids and wound healing", *In:* Antiinflammatory Steroid Action: Basic and Clinical Aspects, Academic Press, New York, pp. 280-302 (1989)). The systemic administration of steroids to impaired wound healing is a well establish phenomenon in rats (Beck *et al.*, *Growth Factors. 5:* 295-304 (1991); Haynes *et al.*, *J. Clin. Invest. 61:* 703-797 (1978); Wahl, "Glucocorticoids and wound healing", *In*: Antiinflammatory Steroid Action: Basic and Clinical Aspects, Academic Press, New York, pp. 280-302 (1989); Pierce *et al.*, *Proc. Natl. Acad. Sci. USA 86*: 2229-2233 (1989)).

To demonstrate that an agonist or antagonist of the invention can accelerate the healing process, the effects of multiple topical applications of the agonist or antagonist on full thickness excisional skin wounds in rats in which healing has been impaired by the systemic administration of methylprednisolone is assessed.

Young adult male Sprague Dawley rats weighing 250-300 g (Charles River Laboratories) are used in this example. The animals are purchased at 8 weeks of age and are 9 weeks old at the beginning of the study. The healing response of rats is impaired by the systemic administration of methylprednisolone (17mg/kg/rat intramuscularly) at the time of wounding. Animals are individually housed and received food and water *ad libitum*. All manipulations are performed using aseptic techniques. This study is conducted according to the rules and guidelines of Human Genome Sciences, Inc. Institutional Animal Care and Use Committee and the Guidelines for the Care and Use of Laboratory Animals.

The wounding protocol is followed according to section A, above. On the day of wounding, animals are anesthetized with an intramuscular injection of ketamine (50 mg/kg) and xylazine (5 mg/kg). The dorsal region of the animal is shaved and the skin washed with 70% ethanol and iodine solutions. The surgical area is dried with sterile gauze prior to wounding. An 8 mm full-thickness wound is created using a Keyes tissue punch. The wounds are left open for the duration of the experiment. Applications of the testing materials

are given topically once a day for 7 consecutive days commencing on the day of wounding and subsequent to methylprednisolone administration. Prior to treatment, wounds are gently cleansed with sterile saline and gauze sponges.

Wounds are visually examined and photographed at a fixed distance at the day of wounding and at the end of treatment. Wound closure is determined by daily measurement on days 1-5 and on day 8. Wounds are measured horizontally and vertically using a calibrated Jameson caliper. Wounds are considered healed if granulation tissue is no longer visible and the wound is covered by a continuous epithelium.

The agonist or antagonist of the invention is administered using at a range different doses, from 4mg to 500mg per wound per day for 8 days in vehicle. Vehicle control groups received 50mL of vehicle solution.

Animals are euthanized on day 8 with an intraperitoneal injection of sodium pentobarbital (300mg/kg). The wounds and surrounding skin are then harvested for histology. Tissue specimens are placed in 10% neutral buffered formalin in tissue cassettes between biopsy sponges for further processing.

Four groups of 10 animals each (5 with methylprednisolone and 5 without glucocorticoid) are evaluated: 1) Untreated group 2) Vehicle placebo control 3) treated groups.

Wound closure is analyzed by measuring the area in the vertical and horizontal axis and obtaining the total area of the wound. Closure is then estimated by establishing the differences between the initial wound area (day 0) and that of post treatment (day 8). The wound area on day 1 is $64mm^2$, the corresponding size of the dermal punch. Calculations are made using the following formula:

[Open area on day 8] - [Open area on day 1] / [Open area on day 1]

Specimens are fixed in 10% buffered formalin and paraffin embedded blocks are sectioned perpendicular to the wound surface (5mm) and cut using an Olympus microtome. Routine hematoxylin-eosin (H&E) staining is performed on cross-sections of bisected wounds. Histologic examination of the wounds allows assessment of whether the healing process and the morphologic appearance of the repaired skin is improved by treatment with an agonist or antagonist of the invention. A calibrated lens micrometer is used by a blinded observer to

determine the distance of the wound gap.

Experimental data are analyzed using an unpaired t test. A p value of < 0.05 is considered significant.

The studies described in this example tested activity of agonists or antagonists of the invention. However, one skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 29: Lymphadema Animal Model

The purpose of this experimental approach is to create an appropriate and consistent lymphedema model for testing the therapeutic effects of an agonist or antagonist of the invention in lymphangiogenesis and re-establishment of the lymphatic circulatory system in the rat hind limb. Effectiveness is measured by swelling volume of the affected limb, quantification of the amount of lymphatic vasculature, total blood plasma protein, and histopathology. Acute lymphedema is observed for 7-10 days. Perhaps more importantly, the chronic progress of the edema is followed for up to 3-4 weeks.

Prior to beginning surgery, blood sample is drawn for protein concentration analysis. Male rats weighing approximately ~350g are dosed with Pentobarbital. Subsequently, the right legs are shaved from knee to hip. The shaved area is swabbed with gauze soaked in 70% EtOH. Blood is drawn for serum total protein testing. Circumference and volumetric measurements are made prior to injecting dye into paws after marking 2 measurement levels (0.5 cm above heel, at mid-pt of dorsal paw). The intradermal dorsum of both right and left paws are injected with 0.05 ml of 1% Evan's Blue. Circumference and volumetric measurements are then made following injection of dye into paws.

Using the knee joint as a landmark, a mid-leg inguinal incision is made circumferentially allowing the femoral vessels to be located. Forceps and hemostats are used to dissect and separate the skin flaps. After locating the femoral vessels, the lymphatic vessel that runs along side and underneath the vessel(s) is located. The main lymphatic vessels in this area are then electrically coagulated or suture ligated.

Using a microscope, muscles in back of the leg (near the semitendinosis and adductors) are bluntly dissected. The popliteal lymph node is then located. The 2 proximal and 2 distal lymphatic vessels and distal blood supply of the popliteal node are then and

ligated by suturing. The popliteal lymph node, and any accompanying adipose tissue, is then removed by cutting connective tissues.

Care is taken to control any mild bleeding resulting from this procedure. After lymphatics are occluded, the skin flaps are sealed by using liquid skin (Vetbond) (AJ Buck). The separated skin edges are sealed to the underlying muscle tissue while leaving a gap of ~0.5 cm around the leg. Skin also may be anchored by suturing to underlying muscle when necessary.

To avoid infection, animals are housed individually with mesh (no bedding). Recovering animals are checked daily through the optimal edematous peak, which typically occurred by day 5-7. The plateau edematous peak are then observed. To evaluate the intensity of the lymphedema, the circumference and volumes of 2 designated places on each paw before operation and daily for 7 days are measured. The effect plasma proteins on lymphedema is determined and whether protein analysis is a useful testing perimeter is also investigated. The weights of both control and edematous limbs are evaluated at 2 places. Analysis is performed in a blind manner.

Circumference Measurements: Under brief gas anesthetic to prevent limb movement, a cloth tape is used to measure limb circumference. Measurements are done at the ankle bone and dorsal paw by 2 different people then those 2 readings are averaged. Readings are taken from both control and edematous limbs.

Volumetric Measurements: On the day of surgery, animals are anesthetized with Pentobarbital and are tested prior to surgery. For daily volumetrics animals are under brief halothane anesthetic (rapid immobilization and quick recovery), both legs are shaved and equally marked using waterproof marker on legs. Legs are first dipped in water, then dipped into instrument to each marked level then measured by Buxco edema software(Chen/Victor). Data is recorded by one person, while the other is dipping the limb to marked area.

Blood-plasma protein measurements: Blood is drawn, spun, and serum separated prior to surgery and then at conclusion for total protein and Ca2+ comparison.

Limb Weight Comparison: After drawing blood, the animal is prepared for tissue collection. The limbs are amputated using a quillitine, then both experimental and control legs are cut at the ligature and weighed. A second weighing is done as the tibio-cacaneal joint is disarticulated and the foot is weighed.

Histological Preparations: The transverse muscle located behind the knee (popliteal)

area is dissected and arranged in a metal mold. filled with freezeGel, dipped into cold methylbutane, placed into labeled sample bags at - 80EC until sectioning. Upon sectioning, the muscle is observed under fluorescent microscopy for lymphatics..

The studies described in this example tested activity of agonists or antagonists of the invention. However, one skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 30: Suppression of TNF alpha-induced adhesion molecule expression by a Agonist or Antagonist of the Invention

The recruitment of lymphocytes to areas of inflammation and angiogenesis involves specific receptor-ligand interactions between cell surface adhesion molecules (CAMs) on lymphocytes and the vascular endothelium. The adhesion process, in both normal and pathological settings, follows a multi-step cascade that involves intercellular adhesion molecule-1 (ICAM-1), vascular cell adhesion molecule-1 (VCAM-1), and endothelial leukocyte adhesion molecule-1 (E-selectin) expression on endothelial cells (EC). The expression of these molecules and others on the vascular endothelium determines the efficiency with which leukocytes may adhere to the local vasculature and extravasate into the local tissue during the development of an inflammatory response. The local concentration of cytokines and growth factor participate in the modulation of the expression of these CAMs.

Tumor necrosis factor alpha (TNF-a), a potent proinflammatory cytokine, is a stimulator of all three CAMs on endothelial cells and may be involved in a wide variety of inflammatory responses, often resulting in a pathological outcome.

The potential of an agonist or antagonist of the invention to mediate a suppression of TNF-a induced CAM expression can be examined. A modified ELISA assay which uses ECs as a solid phase absorbent is employed to measure the amount of CAM expression on TNF-a treated ECs when co-stimulated with a member of the FGF family of proteins.

To perform the experiment, human umbilical vein endothelial cell (HUVEC) cultures are obtained from pooled cord harvests and maintained in growth medium (EGM-2; Clonetics. San Diego, CA) supplemented with 10% FCS and 1% penicillin/streptomycin in a 37 degree C humidified incubator containing 5% CO_2. HUVECs are seeded in 96-well plates at concentrations of 1×10^4 cells/well in EGM medium at 37 degree C for 18-24 hrs or

until confluent. The monolayers are subsequently washed 3 times with a serum-free solution of RPMI-1640 supplemented with 100 U/ml penicillin and 100 mg/ml streptomycin, and treated with a given cytokine and/or growth factor(s) for 24 h at 37 degree C. Following incubation. the cells are then evaluated for CAM expression.

Human Umbilical Vein Endothelial cells (HUVECs) are grown in a standard 96 well plate to confluence. Growth medium is removed from the cells and replaced with 90 ul of 199 Medium (10% FBS). Samples for testing and positive or negative controls are added to the plate in triplicate (in 10 ul volumes). Plates are incubated at 37 degree C for either 5 h (selectin and integrin expression) or 24 h (integrin expression only). Plates are aspirated to remove medium and 100 µl of 0.1% paraformaldehyde-PBS(with Ca++ and Mg++) is added to each well. Plates are held at 4°C for 30 min.

Fixative is then removed from the wells and wells are washed 1X with PBS(+Ca,Mg)+0.5% BSA and drained. Do not allow the wells to dry. Add 10 µl of diluted primary antibody to the test and control wells. Anti-ICAM-1-Biotin, Anti-VCAM-1-Biotin and Anti-E-selectin-Biotin are used at a concentration of 10 µg/ml (1:10 dilution of 0.1 mg/ml stock antibody). Cells are incubated at 37°C for 30 min. in a humidified environment. Wells are washed X3 with PBS(+Ca,Mg)+0.5% BSA.

Then add 20 µl of diluted ExtrAvidin-Alkaline Phosphotase (1:5,000 dilution) to each well and incubated at 37°C for 30 min. Wells are washed X3 with PBS(+Ca,Mg)+0.5% BSA. 1 tablet of p-Nitrophenol Phosphate pNPP is dissolved in 5 ml of glycine buffer (pH 10.4). 100 µl of pNPP substrate in glycine buffer is added to each test well. Standard wells in triplicate are prepared from the working dilution of the ExtrAvidin-Alkaline Phosphotase in glycine buffer: 1:5,000 (10^0) > $10^{-0.5}$ > 10^{-1} > $10^{-1.5}$. 5 µl of each dilution is added to triplicate wells and the resulting AP content in each well is 5.50 ng, 1.74 ng, 0.55 ng, 0.18 ng. 100 µl of pNNP reagent must then be added to each of the standard wells. The plate must be incubated at 37°C for 4h. A volume of 50 µl of 3M NaOH is added to all wells. The results are quantified on a plate reader at 405 nm. The background subtraction option is used on blank wells filled with glycine buffer only. The template is set up to indicate the concentration of AP-conjugate in each standard well [5.50 ng; 1.74 ng; 0.55 ng; 0.18 ng]. Results are indicated as amount of bound AP-conjugate in each sample.

The studies described in this example tested activity of agonists or antagonists of the invention. However, one skilled in the art could easily modify the exemplified studies to test

the activity of polynucleotides or polypeptides of the invention (e.g., gene therapy).

Example 31: Production Of Polypeptide of the Invention For High-Throughput Screening Assays

The following protocol produces a supernatant containing polypeptide of the present invention to be tested. This supernatant can then be used in the Screening Assays described in Examples 33-42.

First, dilute Poly-D-Lysine (644 587 Boehringer-Mannheim) stock solution (1mg/ml in PBS) 1:20 in PBS (w/o calcium or magnesium 17-516F Biowhittaker) for a working solution of 50ug/ml. Add 200 ul of this solution to each well (24 well plates) and incubate at RT for 20 minutes. Be sure to distribute the solution over each well (note: a 12-channel pipetter may be used with tips on every other channel). Aspirate off the Poly-D-Lysine solution and rinse with 1ml PBS (Phosphate Buffered Saline). The PBS should remain in the well until just prior to plating the cells and plates may be poly-lysine coated in advance for up to two weeks.

Plate 293T cells (do not carry cells past P+20) at 2 x 10^5 cells/well in .5ml DMEM(Dulbecco's Modified Eagle Medium)(with 4.5 G/L glucose and L-glutamine (12-604F Biowhittaker))/10% heat inactivated FBS(14-503F Biowhittaker)/1x Penstrep(17-602E Biowhittaker). Let the cells grow overnight.

The next day, mix together in a sterile solution basin: 300 ul Lipofectamine (18324-012 Gibco/BRL) and 5ml Optimem I (31985070 Gibco/BRL)/96-well plate. With a small volume multi-channel pipetter, aliquot approximately 2ug of an expression vector containing a polynucleotide insert, produced by the methods described in Examples 8-10, into an appropriately labeled 96-well round bottom plate. With a multi-channel pipetter, add 50ul of the Lipofectamine/Optimem I mixture to each well. Pipette up and down gently to mix. Incubate at RT 15-45 minutes. After about 20 minutes, use a multi-channel pipetter to add 150ul Optimem I to each well. As a control, one plate of vector DNA lacking an insert should be transfected with each set of transfections.

Preferably, the transfection should be performed by tag-teaming the following tasks. By tag-teaming, hands on time is cut in half, and the cells do not spend too much time on PBS. First, person A aspirates off the media from four 24-well plates of cells, and then

person B rinses each well with .5-1ml PBS. Person A then aspirates off PBS rinse, and person B, using a12-channel pipetter with tips on every other channel, adds the 200ul of DNA/Lipofectamine/Optimem I complex to the odd wells first, then to the even wells, to each row on the 24-well plates. Incubate at 37 degree C for 6 hours.

While cells are incubating, prepare appropriate media, either 1%BSA in DMEM with 1x penstrep, or HGS CHO-5 media (116.6 mg/L of CaCl2 (anhyd); 0.00130 mg/L $CuSO_4$-$5H_2O$; 0.050 mg/L of $Fe(NO_3)_3$-$9H_2O$; 0.417 mg/L of $FeSO_4$-$7H_2O$; 311.80 mg/L of Kcl; 28.64 mg/L of $MgCl_2$; 48.84 mg/L of $MgSO_4$; 6995.50 mg/L of NaCl; 2400.0 mg/L of $NaHCO_3$; 62.50 mg/L of NaH_2PO_4-H_20; 71.02 mg/L of Na_2HPO4; .4320 mg/L of $ZnSO_4$-$7H_2O$; .002 mg/L of Arachidonic Acid ; 1.022 mg/L of Cholesterol; .070 mg/L of DL-alpha-Tocopherol-Acetate; 0.0520 mg/L of Linoleic Acid; 0.010 mg/L of Linolenic Acid; 0.010 mg/L of Myristic Acid; 0.010 mg/L of Oleic Acid; 0.010 mg/L of Palmitric Acid; 0.010 mg/L of Palmitic Acid; 100 mg/L of Pluronic F-68; 0.010 mg/L of Stearic Acid; 2.20 mg/L of Tween 80; 4551 mg/L of D-Glucose; 130.85 mg/ml of L- Alanine; 147.50 mg/ml of L-Arginine-HCL; 7.50 mg/ml of L-Asparagine-H_20; 6.65 mg/ml of L-Aspartic Acid; 29.56 mg/ml of L-Cystine-2HCL-H_20; 31.29 mg/ml of L-Cystine-2HCL; 7.35 mg/ml of L-Glutamic Acid; 365.0 mg/ml of L-Glutamine; 18.75 mg/ml of Glycine; 52.48 mg/ml of L-Histidine-HCL-H_20; 106.97 mg/ml of L-Isoleucine; 111.45 mg/ml of L-Leucine; 163.75 mg/ml of L-Lysine HCL; 32.34 mg/ml of L-Methionine; 68.48 mg/ml of L-Phenylalainine; 40.0 mg/ml of L-Proline; 26.25 mg/ml of L-Serine; 101.05 mg/ml of L-Threonine; 19.22 mg/ml of L-Tryptophan; 91.79 mg/ml of L-Tryrosine-2Na-$2H_20$; and 99.65 mg/ml of L-Valine; 0.0035 mg/L of Biotin; 3.24 mg/L of D-Ca Pantothenate; 11.78 mg/L of Choline Chloride; 4.65 mg/L of Folic Acid; 15.60 mg/L of i-Inositol; 3.02 mg/L of Niacinamide; 3.00 mg/L of Pyridoxal HCL; 0.031 mg/L of Pyridoxine HCL; 0.319 mg/L of Riboflavin; 3.17 mg/L of Thiamine HCL; 0.365 mg/L of Thymidine; 0.680 mg/L of Vitamin B_{12}; 25 mM of HEPES Buffer; 2.39 mg/L of Na Hypoxanthine; 0.105 mg/L of Lipoic Acid; 0.081 mg/L of Sodium Putrescine-2HCL; 55.0 mg/L of Sodium Pyruvate; 0.0067 mg/L of Sodium Selenite; 20uM of Ethanolamine; 0.122 mg/L of Ferric Citrate; 41.70 mg/L of Methyl-B-Cyclodextrin complexed with Linoleic Acid; 33.33 mg/L of Methyl-B-Cyclodextrin complexed with Oleic Acid; 10 mg/L of Methyl-B-Cyclodextrin complexed with Retinal Acetate. Adjust

osmolarity to 327 mOsm) with 2mm glutamine and 1x penstrep. (BSA (81-068-3 Bayer) 100gm dissolved in 1L DMEM for a 10% BSA stock solution). Filter the media and collect 50 ul for endotoxin assay in 15ml polystyrene conical.

The transfection reaction is terminated, preferably by tag-teaming, at the end of the incubation period. Person A aspirates off the transfection media, while person B adds 1.5ml appropriate media to each well. Incubate at 37 degree C for 45 or 72 hours depending on the media used: 1%BSA for 45 hours or CHO-5 for 72 hours.

On day four, using a 300ul multichannel pipetter, aliquot 600ul in one 1ml deep well plate and the remaining supernatant into a 2ml deep well. The supernatants from each well can then be used in the assays described in Examples 33-40.

It is specifically understood that when activity is obtained in any of the assays described below using a supernatant, the activity originates from either the polypeptide of the present invention directly (e.g., as a secreted protein) or by polypeptide of the present invention inducing expression of other proteins, which are then secreted into the supernatant. Thus, the invention further provides a method of identifying the protein in the supernatant characterized by an activity in a particular assay.

Example 32: Construction of GAS Reporter Construct

One signal transduction pathway involved in the differentiation and proliferation of cells is called the Jaks-STATs pathway. Activated proteins in the Jaks-STATs pathway bind to gamma activation site "GAS" elements or interferon-sensitive responsive element ("ISRE"), located in the promoter of many genes. The binding of a protein to these elements alter the expression of the associated gene.

GAS and ISRE elements are recognized by a class of transcription factors called Signal Transducers and Activators of Transcription, or "STATs." There are six members of the STATs family. Stat1 and Stat3 are present in many cell types, as is Stat2 (as response to IFN-alpha is widespread). Stat4 is more restricted and is not in many cell types though it has been found in T helper class I, cells after treatment with IL-12. Stat5 was originally called mammary growth factor, but has been found at higher concentrations in other cells including myeloid cells. It can be activated in tissue culture cells by many cytokines.

The STATs are activated to translocate from the cytoplasm to the nucleus upon

tyrosine phosphorylation by a set of kinases known as the Janus Kinase ("Jaks") family. Jaks represent a distinct family of soluble tyrosine kinases and include Tyk2, Jak1, Jak2. and Jak3. These kinases display significant sequence similarity and are generally catalytically inactive in resting cells.

The Jaks are activated by a wide range of receptors summarized in the Table below. (Adapted from review by Schidler and Darnell, Ann. Rev. Biochem. 64:621-51 (1995).) A cytokine receptor family, capable of activating Jaks, is divided into two groups: (a) Class 1 includes receptors for IL-2, IL-3, IL-4, IL-6, IL-7, IL-9, IL-11, IL-12, IL-15, Epo, PRL, GH, G-CSF, GM-CSF, LIF, CNTF, and thrombopoietin; and (b) Class 2 includes IFN-a, IFN-g, and IL-10. The Class 1 receptors share a conserved cysteine motif (a set of four conserved cysteines and one tryptophan) and a WSXWS motif (a membrane proximal region encoding Trp-Ser-Xxx-Trp-Ser (SEQ ID NO:1548)).

Thus, on binding of a ligand to a receptor, Jaks are activated, which in turn activate STATs, which then translocate and bind to GAS elements. This entire process is encompassed in the Jaks-STATs signal transduction pathway.

Therefore, activation of the Jaks-STATs pathway, reflected by the binding of the GAS or the ISRE element, can be used to indicate proteins involved in the proliferation and differentiation of cells. For example, growth factors and cytokines are known to activate the Jaks-STATs pathway. (See Table below.) Thus, by using GAS elements linked to reporter molecules, activators of the Jaks-STATs pathway can be identified.

		JAKs			STATS	GAS(elements) or ISRE
Ligand	tyk2	Jak1	Jak2	Jak3		
IFN family						
IFN-a/B	+	+	-	-	1,2,3	ISRE
IFN-g		+	+	-	1	GAS
(IRF1>Lys6>IFP)						
Il-10	+	?	?	-	1,3	
gp130 family						
IL-6 (Pleiotrohic)	+	+	+	?	1,3	GAS
(IRF1>Lys6>IFP)						
Il-11(Pleiotrohic)	?	+	?	?	1,3	
OnM(Pleiotrohic)	?	+	+	?	1,3	
LIF(Pleiotrohic)	?	+	+	?	1,3	
CNTF(Pleiotrohic)	-/+	+	+	?	1,3	
G-CSF(Pleiotrohic)	?	+	?	?	1,3	
IL-12(Pleiotrohic)	+	-	+	+	1,3	
g-C family						
IL-2 (lymphocytes)	-	+	-	+	1,3,5	GAS
IL-4 (lymph/myeloid)	-	+	-	+	6	GAS (IRF1 = IFP
>>Ly6)(IgH)						
IL-7 (lymphocytes)	-	+	-	+	5	GAS
IL-9 (lymphocytes)	-	+	-	+	5	GAS
IL-13 (lymphocyte)	-	+	?	?	6	GAS
IL-15	?	+	?	+	5	GAS
gp140 family						
IL-3 (myeloid)	-	-	+	-	5	GAS
(IRF1>IFP>>Ly6)						
IL-5 (myeloid)	-	-	+	-	5	GAS
GM-CSF (myeloid)	-	-	+	-	5	GAS

Growth hormone family						
GH	?	-	+	-	5	
PRL	?	+/-	+	-	1,3,5	
EPO	?	-	+	-	5	GAS(B-CAS>IRF1=IFP>>Ly6)
Receptor Tyrosine Kinases						
EGF	?	+	+	-	1,3	GAS (IRF1)
PDGF	?	+	+	-	1,3	
CSF-1	?	+	+	-	1,3	GAS (not IRF1)

To construct a synthetic GAS containing promoter element, which is used in the Biological Assays described in Examples 33-34, a PCR based strategy is employed to generate a GAS-SV40 promoter sequence. The 5' primer contains four tandem copies of the GAS binding site found in the IRF1 promoter and previously demonstrated to bind STATs upon induction with a range of cytokines (Rothman et al., Immunity 1:457-468 (1994).), although other GAS or ISRE elements can be used instead. The 5' primer also contains 18bp of sequence complementary to the SV40 early promoter sequence and is flanked with an XhoI site. The sequence of the 5' primer is:

5':GCGCCTCGAGATTTCCCCGAAATCTAGATTTCCCCGAAATGATTTCCCC GAAATGATTTCCCCGAAATATCTGCCATCTCAATTAG:3' (SEQ ID NO:1549)

The downstream primer is complementary to the SV40 promoter and is flanked with a Hind III site: 5':GCGGCAAGCTTTTTGCAAAGCCTAGGC:3' (SEQ ID NO:1550)

PCR amplification is performed using the SV40 promoter template present in the B-gal:promoter plasmid obtained from Clontech. The resulting PCR fragment is digested with XhoI/Hind III and subcloned into BLSK2-. (Stratagene.) Sequencing with forward and reverse primers confirms that the insert contains the following sequence:

5':<u>CTCGAG</u>ATTTCCCCGAAATCTAGATTTCCCCGAAATGATTTCCCCGAAA TGATTTCCCCGAAATATCTGCCATCTCAATTAGTCAGCAACCATAGTCCCG CCCCTAACTCCGCCCATCCCGCCCCTAACTCCGCCCAGTTCCGCCCATTCT CCGCCCCATGGCTGACTAATTTTTTTTATTTATGCAGAGGCCGAGGCCGCC TCGGCCTCTGAGCTATTCCAGAAGTAGTGAGGAGGCTTTTTTGGAGGCCTA GGCTTTTGCAAA<u>AAGCTT</u>:3' (SEQ ID NO:1551)

With this GAS promoter element linked to the SV40 promoter, a GAS:SEAP2 reporter construct is next engineered. Here, the reporter molecule is a secreted alkaline phosphatase, or "SEAP." Clearly, however, any reporter molecule can be instead of SEAP, in this or in any of the other Examples. Well known reporter molecules that can be used instead of SEAP include chloramphenicol

acetyltransferase (CAT), luciferase, alkaline phosphatase, B-galactosidase, green fluorescent protein (GFP), or any protein detectable by an antibody.

The above sequence confirmed synthetic GAS-SV40 promoter element is subcloned into the pSEAP-Promoter vector obtained from Clontech using HindIII and XhoI, effectively replacing the SV40 promoter with the amplified GAS:SV40 promoter element, to create the GAS-SEAP vector. However, this vector does not contain a neomycin resistance gene, and therefore, is not preferred for mammalian expression systems.

Thus, in order to generate mammalian stable cell lines expressing the GAS-SEAP reporter, the GAS-SEAP cassette is removed from the GAS-SEAP vector using SalI and NotI, and inserted into a backbone vector containing the neomycin resistance gene, such as pGFP-1 (Clontech), using these restriction sites in the multiple cloning site, to create the GAS-SEAP/Neo vector. Once this vector is transfected into mammalian cells, this vector can then be used as a reporter molecule for GAS binding as described in Examples 33-34.

Other constructs can be made using the above description and replacing GAS with a different promoter sequence. For example, construction of reporter molecules containing NFK-B and EGR promoter sequences are described in Examples 35 and 36. However, many other promoters can be substituted using the protocols described in these Examples. For instance, SRE, IL-2, NFAT, or Osteocalcin promoters can be substituted, alone or in combination (e.g., GAS/NF-KB/EGR, GAS/NF-KB, Il-2/NFAT, or NF-KB/GAS). Similarly, other cell lines can be used to test reporter construct activity, such as HELA (epithelial), HUVEC (endothelial), Reh (B-cell), Saos-2 (osteoblast), HUVAC (aortic), or Cardiomyocyte.

Example 33: High-Throughput Screening Assay for T-cell Activity.

The following protocol is used to assess T-cell activity by identifying factors, and determining whether supernate containing a polypeptide of the invention proliferates and/or differentiates T-cells. T-cell activity is assessed using the

GAS/SEAP/Neo construct produced in Example 32. Thus, factors that increase SEAP activity indicate the ability to activate the Jaks-STATS signal transduction pathway. The T-cell used in this assay is Jurkat T-cells (ATCC Accession No. TIB-152), although Molt-3 cells (ATCC Accession No. CRL-1552) and Molt-4 cells (ATCC Accession No. CRL-1582) cells can also be used.

Jurkat T-cells are lymphoblastic CD4+ Th1 helper cells. In order to generate stable cell lines, approximately 2 million Jurkat cells are transfected with the GAS-SEAP/neo vector using DMRIE-C (Life Technologies)(transfection procedure described below). The transfected cells are seeded to a density of approximately 20,000 cells per well and transfectants resistant to 1 mg/ml genticin selected. Resistant colonies are expanded and then tested for their response to increasing concentrations of interferon gamma. The dose response of a selected clone is demonstrated.

Specifically, the following protocol will yield sufficient cells for 75 wells containing 200 ul of cells. Thus, it is either scaled up, or performed in multiple to generate sufficient cells for multiple 96 well plates. Jurkat cells are maintained in RPMI + 10% serum with 1%Pen-Strep. Combine 2.5 mls of OPTI-MEM (Life Technologies) with 10 ug of plasmid DNA in a T25 flask. Add 2.5 ml OPTI-MEM containing 50 ul of DMRIE-C and incubate at room temperature for 15-45 mins.

During the incubation period, count cell concentration, spin down the required number of cells (10^7 per transfection), and resuspend in OPTI-MEM to a final concentration of 10^7 cells/ml. Then add 1ml of 1 x 10^7 cells in OPTI-MEM to T25 flask and incubate at 37 degree C for 6 hrs. After the incubation, add 10 ml of RPMI + 15% serum.

The Jurkat:GAS-SEAP stable reporter lines are maintained in RPMI + 10% serum, 1 mg/ml Genticin, and 1% Pen-Strep. These cells are treated with supernatants containing polypeptide of the present invention or polypeptide of the present invention induced polypeptides as produced by the protocol described in Example 31.

On the day of treatment with the supernatant, the cells should be washed and

resuspended in fresh RPMI + 10% serum to a density of 500,000 cells per ml. The exact number of cells required will depend on the number of supernatants being screened. For one 96 well plate, approximately 10 million cells (for 10 plates, 100 million cells) are required.

Transfer the cells to a triangular reservoir boat, in order to dispense the cells into a 96 well dish, using a 12 channel pipette. Using a 12 channel pipette, transfer 200 ul of cells into each well (therefore adding 100, 000 cells per well).

After all the plates have been seeded, 50 ul of the supernatants are transferred directly from the 96 well plate containing the supernatants into each well using a 12 channel pipette. In addition, a dose of exogenous interferon gamma (0.1, 1.0, 10 ng) is added to wells H9, H10, and H11 to serve as additional positive controls for the assay.

The 96 well dishes containing Jurkat cells treated with supernatants are placed in an incubator for 48 hrs (note: this time is variable between 48-72 hrs). 35 ul samples from each well are then transferred to an opaque 96 well plate using a 12 channel pipette. The opaque plates should be covered (using sellophene covers) and stored at -20 degree C until SEAP assays are performed according to Example 37. The plates containing the remaining treated cells are placed at 4 degree C and serve as a source of material for repeating the assay on a specific well if desired.

As a positive control, 100 Unit/ml interferon gamma can be used which is known to activate Jurkat T cells. Over 30 fold induction is typically observed in the positive control wells.

The above protocol may be used in the generation of both transient, as well as, stable transfected cells, which would be apparent to those of skill in the art.

Example 34: High-Throughput Screening Assay Identifying Myeloid Activity

The following protocol is used to assess myeloid activity of polypeptide of the present invention by determining whether polypeptide of the present invention proliferates and/or differentiates myeloid cells. Myeloid cell activity is assessed using

the GAS/SEAP/Neo construct produced in Example 32. Thus, factors that increase SEAP activity indicate the ability to activate the Jaks-STATS signal transduction pathway. The myeloid cell used in this assay is U937, a pre-monocyte cell line, although TF-1, HL60, or KG1 can be used.

To transiently transfect U937 cells with the GAS/SEAP/Neo construct produced in Example 32, a DEAE-Dextran method (Kharbanda et. al., 1994, Cell Growth & Differentiation, 5:259-265) is used. First, harvest 2x10e^7 U937 cells and wash with PBS. The U937 cells are usually grown in RPMI 1640 medium containing 10% heat-inactivated fetal bovine serum (FBS) supplemented with 100 units/ml penicillin and 100 mg/ml streptomycin.

Next, suspend the cells in 1 ml of 20 mM Tris-HCl (pH 7.4) buffer containing 0.5 mg/ml DEAE-Dextran, 8 ug GAS-SEAP2 plasmid DNA, 140 mM NaCl, 5 mM KCl, 375 uM $Na_2HPO_4.7H_2O$, 1 mM $MgCl_2$, and 675 uM $CaCl_2$. Incubate at 37 degrees C for 45 min.

Wash the cells with RPMI 1640 medium containing 10% FBS and then resuspend in 10 ml complete medium and incubate at 37 degree C for 36 hr.

The GAS-SEAP/U937 stable cells are obtained by growing the cells in 400 ug/ml G418. The G418-free medium is used for routine growth but every one to two months, the cells should be re-grown in 400 ug/ml G418 for couple of passages.

These cells are tested by harvesting $1x10^8$ cells (this is enough for ten 96-well plates assay) and wash with PBS. Suspend the cells in 200 ml above described growth medium, with a final density of $5x10^5$ cells/ml. Plate 200 ul cells per well in the 96-well plate (or $1x10^5$ cells/well).

Add 50 ul of the supernatant prepared by the protocol described in Example 31. Incubate at 37 degee C for 48 to 72 hr. As a positive control, 100 Unit/ml interferon gamma can be used which is known to activate U937 cells. Over 30 fold induction is typically observed in the positive control wells. SEAP assay the supernatant according to the protocol described in Example 37.

Example 35: High-Throughput Screening Assay Identifying Neuronal Activity.

When cells undergo differentiation and proliferation, a group of genes are activated through many different signal transduction pathways. One of these genes, EGR1 (early growth response gene 1), is induced in various tissues and cell types upon activation. The promoter of EGR1 is responsible for such induction. Using the EGR1 promoter linked to reporter molecules, activation of cells can be assessed by polypeptide of the present invention.

Particularly, the following protocol is used to assess neuronal activity in PC12 cell lines. PC12 cells (rat phenochromocytoma cells) are known to proliferate and/or differentiate by activation with a number of mitogens, such as TPA (tetradecanoyl phorbol acetate), NGF (nerve growth factor), and EGF (epidermal growth factor). The EGR1 gene expression is activated during this treatment. Thus, by stably transfecting PC12 cells with a construct containing an EGR promoter linked to SEAP reporter, activation of PC12 cells by polypeptide of the present invention can be assessed.

The EGR/SEAP reporter construct can be assembled by the following protocol. The EGR-1 promoter sequence (-633 to +1)(Sakamoto K et al., Oncogene 6:867-871 (1991)) can be PCR amplified from human genomic DNA using the following primers:

5' GCGCTCGAGGGATGACAGCGATAGAACCCCGG -3' (SEQ ID NO: 1552)

5' GCGAAGCTTCGCGACTCCCCGGATCCGCCTC-3' (SEQ ID NO: 1553)

Using the GAS:SEAP/Neo vector produced in Example 32, EGR1 amplified product can then be inserted into this vector. Linearize the GAS:SEAP/Neo vector using restriction enzymes XhoI/HindIII, removing the GAS/SV40 stuffer. Restrict the EGR1 amplified product with these same enzymes. Ligate the vector and the EGR1 promoter.

To prepare 96 well-plates for cell culture, two mls of a coating solution (1:30 dilution of collagen type I (Upstate Biotech Inc. Cat#08-115) in 30% ethanol (filter

sterilized)) is added per one 10 cm plate or 50 ml per well of the 96-well plate, and allowed to air dry for 2 hr.

PC12 cells are routinely grown in RPMI-1640 medium (Bio Whittaker) containing 10% horse serum (JRH BIOSCIENCES, Cat. # 12449-78P), 5% heat-inactivated fetal bovine serum (FBS) supplemented with 100 units/ml penicillin and 100 ug/ml streptomycin on a precoated 10 cm tissue culture dish. One to four split is done every three to four days. Cells are removed from the plates by scraping and resuspended with pipetting up and down for more than 15 times.

Transfect the EGR/SEAP/Neo construct into PC12 using the Lipofectamine protocol described in Example 31. EGR-SEAP/PC12 stable cells are obtained by growing the cells in 300 ug/ml G418. The G418-free medium is used for routine growth but every one to two months, the cells should be re-grown in 300 ug/ml G418 for couple of passages.

To assay for neuronal activity, a 10 cm plate with cells around 70 to 80% confluent is screened by removing the old medium. Wash the cells once with PBS (Phosphate buffered saline). Then starve the cells in low serum medium (RPMI-1640 containing 1% horse serum and 0.5% FBS with antibiotics) overnight.

The next morning, remove the medium and wash the cells with PBS. Scrape off the cells from the plate, suspend the cells well in 2 ml low serum medium. Count the cell number and add more low serum medium to reach final cell density as $5x10^5$ cells/ml.

Add 200 ul of the cell suspension to each well of 96-well plate (equivalent to $1x10^5$ cells/well). Add 50 ul supernatant produced by Example 31, 37 degree C for 48 to 72 hr. As a positive control, a growth factor known to activate PC12 cells through EGR can be used, such as 50 ng/ul of Neuronal Growth Factor (NGF). Over fifty-fold induction of SEAP is typically seen in the positive control wells. SEAP assay the supernatant according to Example 37.

Example 36: High-Throughput Screening Assay for T-cell Activity

NF-KB (Nuclear Factor KB) is a transcription factor activated by a wide variety of agents including the inflammatory cytokines IL-1 and TNF. CD30 and CD40, lymphotoxin-alpha and lymphotoxin-beta, by exposure to LPS or thrombin, and by expression of certain viral gene products. As a transcription factor, NF-KB regulates the expression of genes involved in immune cell activation, control of apoptosis (NF- KB appears to shield cells from apoptosis), B and T-cell development, anti-viral and antimicrobial responses, and multiple stress responses.

In non-stimulated conditions, NF- KB is retained in the cytoplasm with I-KB (Inhibitor KB). However, upon stimulation, I- KB is phosphorylated and degraded, causing NF- KB to shuttle to the nucleus, thereby activating transcription of target genes. Target genes activated by NF- KB include IL-2, IL-6, GM-CSF, ICAM-1 and class I MHC.

Due to its central role and ability to respond to a range of stimuli, reporter constructs utilizing the NF-KB promoter element are used to screen the supernatants produced in Example 31. Activators or inhibitors of NF-KB would be useful in treating, preventing, and/or diagnosing diseases. For example, inhibitors of NF-KB could be used to treat those diseases related to the acute or chronic activation of NF-KB, such as rheumatoid arthritis.

To construct a vector containing the NF-KB promoter element, a PCR based strategy is employed. The upstream primer contains four tandem copies of the NF-KB binding site (GGGGACTTTCCC) (SEQ ID NO:1554), 18 bp of sequence complementary to the 5' end of the SV40 early promoter sequence, and is flanked with an XhoI site:

5':GCGGCCTCGAGGGGACTTTCCCGGGGACTTTCCGGGGACTTTCCGGGAC TTTCCATCCTGCCATCTCAATTAG:3' (SEQ ID NO:1555)

The downstream primer is complementary to the 3' end of the SV40 promoter and is flanked with a Hind III site:

5':GCGGCAAGCTTTTTGCAAAGCCTAGGC:3' (SEQ ID NO:1550)

PCR amplification is performed using the SV40 promoter template present in the pB-gal:promoter plasmid obtained from Clontech. The resulting PCR fragment is

digested with XhoI and Hind III and subcloned into BLSK2-. (Stratagene) Sequencing with the T7 and T3 primers confirms the insert contains the following sequence:

5':CTCGAGGGGACTTTCCCGGGGACTTTCCGGGGACTTTCCGGGACTTTCC
ATCTGCCATCTCAATTAGTCAGCAACCATAGTCCCGCCCCTAACTCCGCCC
ATCCCGCCCCTAACTCCGCCCAGTTCCGCCCATTCTCCGCCCCATGGCTGA
CTAATTTTTTTTATTTATGCAGAGGCCGAGGCCGCCTCGGCCTCTGAGCTA
TTCCAGAAGTAGTGAGGAGGCTTTTTTGGAGGCCTAGGCTTTTGCAAAAA
GCTT:3' (SEQ ID NO:1556)

Next, replace the SV40 minimal promoter element present in the pSEAP2-promoter plasmid (Clontech) with this NF-KB/SV40 fragment using XhoI and HindIII. However, this vector does not contain a neomycin resistance gene, and therefore, is not preferred for mammalian expression systems.

In order to generate stable mammalian cell lines, the NF-KB/SV40/SEAP cassette is removed from the above NF-KB/SEAP vector using restriction enzymes SalI and NotI, and inserted into a vector containing neomycin resistance. Particularly, the NF-KB/SV40/SEAP cassette was inserted into pGFP-1 (Clontech), replacing the GFP gene, after restricting pGFP-1 with SalI and NotI.

Once NF-KB/SV40/SEAP/Neo vector is created, stable Jurkat T-cells are created and maintained according to the protocol described in Example 33. Similarly, the method for assaying supernatants with these stable Jurkat T-cells is also described in Example 33. As a positive control, exogenous TNF alpha (0.1,1, 10 ng) is added to wells H9, H10, and H11, with a 5-10 fold activation typically observed.

Example 37: Assay for SEAP Activity

As a reporter molecule for the assays described in Examples 33-36, SEAP activity is assayed using the Tropix Phospho-light Kit (Cat. BP-400) according to the following general procedure. The Tropix Phospho-light Kit supplies the Dilution, Assay, and Reaction Buffers used below.

Prime a dispenser with the 2.5x Dilution Buffer and dispense 15 ul of 2.5x dilution buffer into Optiplates containing 35 ul of a supernatant. Seal the plates with a plastic sealer and incubate at 65 degree C for 30 min. Separate the Optiplates to avoid uneven heating.

Cool the samples to room temperature for 15 minutes. Empty the dispenser and prime with the Assay Buffer. Add 50 ml Assay Buffer and incubate at room temperature 5 min. Empty the dispenser and prime with the Reaction Buffer (see the table below). Add 50 ul Reaction Buffer and incubate at room temperature for 20 minutes. Since the intensity of the chemiluminescent signal is time dependent, and it takes about 10 minutes to read 5 plates on luminometer, one should treat 5 plates at each time and start the second set 10 minutes later.

Read the relative light unit in the luminometer. Set H12 as blank, and print the results. An increase in chemiluminescence indicates reporter activity.

Reaction Buffer Formulation:

# of plates	Rxn buffer diluent (ml)	CSPD (ml)
10	60	3
11	65	3.25
12	70	3.5
13	75	3.75
14	80	4
15	85	4.25
16	90	4.5
17	95	4.75
18	100	5
19	105	5.25
20	110	5.5
21	115	5.75
22	120	6
23	125	6.25
24	130	6.5

25	135	6.75
26	140	7
27	145	7.25
28	150	7.5
29	155	7.75
30	160	8
31	165	8.25
32	170	8.5
33	175	8.75
34	180	9
35	185	9.25
36	190	9.5
37	195	9.75
38	200	10
39	205	10.25
40	210	10.5
41	215	10.75
42	220	11
43	225	11.25
44	230	11.5
45	235	11.75
46	240	12
47	245	12.25
48	250	12.5
49	255	12.75
50	260	13

Example 38: High-Throughput Screening Assay Identifying Changes in Small Molecule Concentration and Membrane Permeability

Binding of a ligand to a receptor is known to alter intracellular levels of small molecules, such as calcium, potassium, sodium, and pH, as well as alter membrane potential. These alterations can be measured in an assay to identify supernatants which bind to receptors of a particular cell. Although the following protocol

describes an assay for calcium, this protocol can easily be modified to detect changes in potassium, sodium, pH, membrane potential, or any other small molecule which is detectable by a fluorescent probe.

The following assay uses Fluorometric Imaging Plate Reader ("FLIPR") to measure changes in fluorescent molecules (Molecular Probes) that bind small molecules. Clearly, any fluorescent molecule detecting a small molecule can be used instead of the calcium fluorescent molecule, fluo-4 (Molecular Probes, Inc.; catalog no. F-14202), used here.

For adherent cells, seed the cells at 10,000 -20,000 cells/well in a Co-star black 96-well plate with clear bottom. The plate is incubated in a CO_2 incubator for 20 hours. The adherent cells are washed two times in Biotek washer with 200 ul of HBSS (Hank's Balanced Salt Solution) leaving 100 ul of buffer after the final wash.

A stock solution of 1 mg/ml fluo-4 is made in 10% pluronic acid DMSO. To load the cells with fluo-4 , 50 ul of 12 ug/ml fluo-4 is added to each well. The plate is incubated at 37 degrees C in a CO_2 incubator for 60 min. The plate is washed four times in the Biotek washer with HBSS leaving 100 ul of buffer.

For non-adherent cells, the cells are spun down from culture media. Cells are re-suspended to 2-5x10^6 cells/ml with HBSS in a 50-ml conical tube. 4 ul of 1 mg/ml fluo-4 solution in 10% pluronic acid DMSO is added to each ml of cell suspension. The tube is then placed in a 37 degrees C water bath for 30-60 min. The cells are washed twice with HBSS, resuspended to 1x10^6 cells/ml, and dispensed into a microplate, 100 ul/well. The plate is centrifuged at 1000 rpm for 5 min. The plate is then washed once in Denley Cell Wash with 200 ul, followed by an aspiration step to 100 ul final volume.

For a non-cell based assay, each well contains a fluorescent molecule, such as fluo-4 . The supernatant is added to the well, and a change in fluorescence is detected.

To measure the fluorescence of intracellular calcium, the FLIPR is set for the following parameters: (1) System gain is 300-800 mW; (2) Exposure time is 0.4 second; (3) Camera F/stop is F/2; (4) Excitation is 488 nm; (5) Emission is 530 nm;

and (6) Sample addition is 50 ul. Increased emission at 530 nm indicates an extracellular signaling event caused by the a molecule. either polypeptide of the present invention or a molecule induced by polypeptide of the present invention, which has resulted in an increase in the intracellular Ca^{++} concentration.

Example 40: High-Throughput Screening Assay Identifying Tyrosine Kinase Activity

The Protein Tyrosine Kinases (PTK) represent a diverse group of transmembrane and cytoplasmic kinases. Within the Receptor Protein Tyrosine Kinase RPTK) group are receptors for a range of mitogenic and metabolic growth factors including the PDGF, FGF, EGF, NGF, HGF and Insulin receptor subfamilies. In addition there are a large family of RPTKs for which the corresponding ligand is unknown. Ligands for RPTKs include mainly secreted small proteins, but also membrane-bound and extracellular matrix proteins.

Activation of RPTK by ligands involves ligand-mediated receptor dimerization, resulting in transphosphorylation of the receptor subunits and activation of the cytoplasmic tyrosine kinases. The cytoplasmic tyrosine kinases include receptor associated tyrosine kinases of the src-family (e.g., src, yes, lck, lyn, fyn) and non-receptor linked and cytosolic protein tyrosine kinases, such as the Jak family, members of which mediate signal transduction triggered by the cytokine superfamily of receptors (e.g., the Interleukins, Interferons, GM-CSF, and Leptin).

Because of the wide range of known factors capable of stimulating tyrosine kinase activity, identifying whether polypeptide of the present invention or a molecule induced by polypeptide of the present invention is capable of activating tyrosine kinase signal transduction pathways is of interest. Therefore, the following protocol is designed to identify such molecules capable of activating the tyrosine kinase signal transduction pathways.

Seed target cells (e.g., primary keratinocytes) at a density of approximately 25,000 cells per well in a 96 well Loprodyne Silent Screen Plates purchased from Nalge Nunc (Naperville, IL). The plates are sterilized with two 30 minute rinses with

100% ethanol. rinsed with water and dried overnight. Some plates are coated for 2 hr with 100 ml of cell culture grade type I collagen (50 mg/ml). gelatin (2%) or polylysine (50 mg/ml), all of which can be purchased from Sigma Chemicals (St. Louis, MO) or 10% Matrigel purchased from Becton Dickinson (Bedford,MA), or calf serum. rinsed with PBS and stored at 4 degree C. Cell growth on these plates is assayed by seeding 5,000 cells/well in growth medium and indirect quantitation of cell number through use of alamarBlue as described by the manufacturer Alamar Biosciences. Inc. (Sacramento, CA) after 48 hr. Falcon plate covers #3071 from Becton Dickinson (Bedford,MA) are used to cover the Loprodyne Silent Screen Plates. Falcon Microtest III cell culture plates can also be used in some proliferation experiments.

To prepare extracts, A431 cells are seeded onto the nylon membranes of Loprodyne plates (20,000/200ml/well) and cultured overnight in complete medium. Cells are quiesced by incubation in serum-free basal medium for 24 hr. After 5-20 minutes treatment with EGF (60ng/ml) or 50 ul of the supernatant produced in Example 31, the medium was removed and 100 ml of extraction buffer ((20 mM HEPES pH 7.5, 0.15 M NaCl, 1% Triton X-100, 0.1% SDS, 2 mM Na_3VO_4, 2 mM $Na_4P_2O_7$ and a cocktail of protease inhibitors (# 1836170) obtained from Boeheringer Mannheim (Indianapolis, IN) is added to each well and the plate is shaken on a rotating shaker for 5 minutes at 4^oC. The plate is then placed in a vacuum transfer manifold and the extract filtered through the 0.45 mm membrane bottoms of each well using house vacuum. Extracts are collected in a 96-well catch/assay plate in the bottom of the vacuum manifold and immediately placed on ice. To obtain extracts clarified by centrifugation, the content of each well, after detergent solubilization for 5 minutes, is removed and centrifuged for 15 minutes at 4 degree C at 16,000 x g.

Test the filtered extracts for levels of tyrosine kinase activity. Although many methods of detecting tyrosine kinase activity are known, one method is described here.

Generally, the tyrosine kinase activity of a supernatant is evaluated by

determining its ability to phosphorylate a tyrosine residue on a specific substrate (a biotinylated peptide). Biotinylated peptides that can be used for this purpose include PSK1 (corresponding to amino acids 6-20 of the cell division kinase cdc2-p34) and PSK2 (corresponding to amino acids 1-17 of gastrin). Both peptides are substrates for a range of tyrosine kinases and are available from Boehringer Mannheim.

The tyrosine kinase reaction is set up by adding the following components in order. First, add 10ul of 5uM Biotinylated Peptide, then 10ul ATP/Mg_{2+} (5mM ATP/50mM $MgCl_2$), then 10ul of 5x Assay Buffer (40mM imidazole hydrochloride, pH7.3, 40 mM beta-glycerophosphate, 1mM EGTA, 100mM $MgCl_2$, 5 mM $MnCl_2$, 0.5 mg/ml BSA), then 5ul of Sodium Vanadate(1mM), and then 5ul of water. Mix the components gently and preincubate the reaction mix at 30 degree C for 2 min. Initial the reaction by adding 10ul of the control enzyme or the filtered supernatant.

The tyrosine kinase assay reaction is then terminated by adding 10 ul of 120mm EDTA and place the reactions on ice.

Tyrosine kinase activity is determined by transferring 50 ul aliquot of reaction mixture to a microtiter plate (MTP) module and incubating at 37 degree C for 20 min. This allows the streptavadin coated 96 well plate to associate with the biotinylated peptide. Wash the MTP module with 300ul/well of PBS four times. Next add 75 ul of anti-phospotyrosine antibody conjugated to horse radish peroxidase(anti-P-Tyr-POD(0.5u/ml)) to each well and incubate at 37 degree C for one hour. Wash the well as above.

Next add 100ul of peroxidase substrate solution (Boehringer Mannheim) and incubate at room temperature for at least 5 mins (up to 30 min). Measure the absorbance of the sample at 405 nm by using ELISA reader. The level of bound peroxidase activity is quantitated using an ELISA reader and reflects the level of tyrosine kinase activity.

Example 41: High-Throughput Screening Assay Identifying Phosphorylation Activity

As a potential alternative and/or compliment to the assay of protein tyrosine

kinase activity described in Example 40, an assay which detects activation (phosphorylation) of major intracellular signal transduction intermediates can also be used. For example, as described below one particular assay can detect tyrosine phosphorylation of the Erk-1 and Erk-2 kinases. However, phosphorylation of other molecules, such as Raf, JNK, p38 MAP, Map kinase kinase (MEK), MEK kinase, Src, Muscle specific kinase (MuSK), IRAK, Tec, and Janus, as well as any other phosphoserine, phosphotyrosine, or phosphothreonine molecule, can be detected by substituting these molecules for Erk-1 or Erk-2 in the following assay.

Specifically, assay plates are made by coating the wells of a 96-well ELISA plate with 0.1ml of protein G (1ug/ml) for 2 hr at room temp, (RT). The plates are then rinsed with PBS and blocked with 3% BSA/PBS for 1 hr at RT. The protein G plates are then treated with 2 commercial monoclonal antibodies (100ng/well) against Erk-1 and Erk-2 (1 hr at RT) (Santa Cruz Biotechnology). (To detect other molecules, this step can easily be modified by substituting a monoclonal antibody detecting any of the above described molecules.) After 3-5 rinses with PBS, the plates are stored at 4 degree C until use.

A431 cells are seeded at 20,000/well in a 96-well Loprodyne filterplate and cultured overnight in growth medium. The cells are then starved for 48 hr in basal medium (DMEM) and then treated with EGF (6ng/well) or 50 ul of the supernatants obtained in Example 31 for 5-20 minutes. The cells are then solubilized and extracts filtered directly into the assay plate.

After incubation with the extract for 1 hr at RT, the wells are again rinsed. As a positive control, a commercial preparation of MAP kinase (10ng/well) is used in place of A431 extract. Plates are then treated with a commercial polyclonal (rabbit) antibody (1ug/ml) which specifically recognizes the phosphorylated epitope of the Erk-1 and Erk-2 kinases (1 hr at RT). This antibody is biotinylated by standard procedures. The bound polyclonal antibody is then quantitated by successive incubations with Europium-streptavidin and Europium fluorescence enhancing reagent in the Wallac DELFIA instrument (time-resolved fluorescence). An increased fluorescent signal over background indicates a phosphorylation by polypeptide of the

present invention or a molecule induced by polypeptide of the present invention.

Example 42: Assay for the Stimulation of Bone Marrow CD34+ Cell Proliferation

This assay is based on the ability of human CD34+ to proliferate in the presence of hematopoietic growth factors and evaluates the ability of isolated polypeptides expressed in mammalian cells to stimulate proliferation of CD34+ cells.

It has been previously shown that most mature precursors will respond to only a single signal. More immature precursors require at least two signals to respond. Therefore, to test the effect of polypeptides on hematopoietic activity of a wide range of progenitor cells, the assay contains a given polypeptide in the presence or absence of other hematopoietic growth factors. Isolated cells are cultured for 5 days in the presence of Stem Cell Factor (SCF) in combination with tested sample. SCF alone has a very limited effect on the proliferation of bone marrow (BM) cells, acting in such conditions only as a "survival" factor. However, combined with any factor exhibiting stimulatory effect on these cells (e.g., IL-3), SCF will cause a synergistic effect. Therefore, if the tested polypeptide has a stimulatory effect on a hematopoietic progenitors, such activity can be easily detected. Since normal BM cells have a low level of cycling cells, it is likely that any inhibitory effect of a given polypeptide, or agonists or antagonists thereof, might not be detected. Accordingly, assays for an inhibitory effect on progenitors is preferably tested in cells that are first subjected to *in vitro* stimulation with SCF+IL+3, and then contacted with the compound that is being evaluated for inhibition of such induced proliferation.

Briefly, CD34+ cells are isolated using methods known in the art. The cells are thawed and resuspended in medium (QBSF 60 serum-free medium with 1% L-glutamine (500ml) Quality Biological, Inc., Gaithersburg, MD Cat# 160-204-101). After several gentle centrifugation steps at 200 x g, cells are allowed to rest for one hour. The cell count is adjusted to 2.5×10^5 cells/ml. During this time, 100 μl of sterile water is added to the peripheral wells of a 96-well plate. The cytokines that can be tested with a given polypeptide in this assay is rhSCF (R&D Systems,

Minneapolis, MN, Cat# 255-SC) at 50 ng/ml alone and in combination with rhSCF and rhIL-3 (R&D Systems, Minneapolis, MN, Cat# 203-ML) at 30 ng/ml. After one hour, 10 µl of prepared cytokines, 50 µl of the supernatants prepared in Example 31 (supernatants at 1:2 dilution = 50 µl) and 20 µl of diluted cells are added to the media which is already present in the wells to allow for a final total volume of 100 µl. The plates are then placed in a 37°C/5% CO_2 incubator for five days.

Eighteen hours before the assay is harvested, 0.5 µCi/well of [3H] Thymidine is added in a 10 µl volume to each well to determine the proliferation rate. The experiment is terminated by harvesting the cells from each 96-well plate to a filtermat using the Tomtec Harvester 96. After harvesting, the filtermats are dried, trimmed and placed into OmniFilter assemblies consisting of one OmniFilter plate and one OmniFilter Tray. 60 µl Microscint is added to each well and the plate sealed with TopSeal-A press-on sealing film A bar code 15 sticker is affixed to the first plate for counting. The sealed plates is then loaded and the level of radioactivity determined via the Packard Top Count and the printed data collected for analysis. The level of radioactivity reflects the amount of cell proliferation.

The studies described in this example test the activity of a given polypeptide to stimulate bone marrow CD34+ cell proliferation. One skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides (e.g., gene therapy), antibodies, agonists, and/or antagonists and fragments and variants thereof. As a nonlimiting example, potential antagonists tested in this assay would be expected to inhibit cell proliferation in the presence of cytokines and/or to increase the inhibition of cell proliferation in the presence of cytokines and a given polypeptide. In contrast, potential agonists tested in this assay would be expected to enhance cell proliferation and/or to decrease the inhibition of cell proliferation in the presence of cytokines and a given polypeptide.

The ability of a gene to stimulate the proliferation of bone marrow CD34+ cells indicates that polynucleotides and polypeptides corresponding to the gene are useful for the diagnosis and treatment of disorders affecting the immune system and hematopoiesis. Representative uses are described in the "Immune Activity" and

"Infectious Disease" sections above. and elsewhere herein.

Example 43: Assay for Extracellular Matrix Enhanced Cell Response (EMECR)

The objective of the Extracellular Matrix Enhanced Cell Response (EMECR) assay is to identify gene products (e.g., isolated polypeptides) that act on the hematopoietic stem cells in the context of the extracellular matrix (ECM) induced signal.

Cells respond to the regulatory factors in the context of signal(s) received from the surrounding microenvironment. For example, fibroblasts, and endothelial and epithelial stem cells fail to replicate in the absence of signals from the ECM. Hematopoietic stem cells can undergo self-renewal in the bone marrow, but not in *in vitro* suspension culture. The ability of stem cells to undergo self-renewal *in vitro* is dependent upon their interaction with the stromal cells and the ECM protein fibronectin (fn). Adhesion of cells to fn is mediated by the $\alpha_5.\beta_1$ and $\alpha_4.\beta_1$ integrin receptors, which are expressed by human and mouse hematopoietic stem cells. The factor(s) which integrate with the ECM environment and responsible for stimulating stem cell self-renewal has not yet been identified. Discovery of such factors should be of great interest in gene therapy and bone marrow transplant applications

Briefly, polystyrene, non tissue culture treated, 96-well plates are coated with fn fragment at a coating concentration of 0.2 μg/ cm^2. Mouse bone marrow cells are plated (1,000 cells/well) in 0.2 ml of serum-free medium. Cells cultured in the presence of IL-3 (5 ng/ml) + SCF (50 ng/ml) would serve as the positive control, conditions under which little self-renewal but pronounced differentiation of the stem cells is to be expected. Gene products of the invention (e.g., including, but not limited to, polynucleotides and polypeptides of the present invention, and supernatants produced in Example 31), are tested with appropriate negative controls in the presence and absence of SCF(5.0 ng/ml), where test factor supernates represent 10% of the total assay volume. The plated cells are then allowed to grow by incubating in a low oxygen environment (5% CO_2, 7% O_2, and 88% N_2) tissue culture incubator

for 7 days. The number of proliferating cells within the wells is then quantitated by measuring thymidine incorporation into cellular DNA. Verification of the positive hits in the assay will require phenotypic characterization of the cells, which can be accomplished by scaling up of the culture system and using appropriate antibody reagents against cell surface antigens and FACScan.

One skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides (e.g., gene therapy), antibodies, agonists, and/or antagonists and fragments and variants thereof.

If a particular polypeptide of the present invention is found to be a stimulator of hematopoietic progenitors, polynucleotides and polypeptides corresponding to the gene encoding said polypeptide may be useful for the diagnosis and treatment of disorders affecting the immune system and hematopoiesis. Representative uses are described in the "Immune Activity" and "Infectious Disease" sections above, and elsewhere herein. The gene product may also be useful in the expansion of stem cells and committed progenitors of various blood lineages, and in the differentiation and/or proliferation of various cell types.

Additionally, the polynucleotides and/or polypeptides of the gene of interest and/or agonists and/or antagonists thereof, may also be employed to inhibit the proliferation and differentiation of hematopoietic cells and therefore may be employed to protect bone marrow stem cells from chemotherapeutic agents during chemotherapy. This antiproliferative effect may allow administration of higher doses of chemotherapeutic agents and, therefore, more effective chemotherapeutic treatment.

Moreover, polynucleotides and polypeptides corresponding to the gene of interest may also be useful for the treatment and diagnosis of hematopoietic related disorders such as, for example, anemia, pancytopenia, leukopenia, thrombocytopenia or leukemia since stromal cells are important in the production of cells of hematopoietic lineages. The uses include bone marrow cell ex-vivo culture, bone marrow transplantation, bone marrow reconstitution, radiotherapy or chemotherapy of neoplasia.

Example 44: Human Dermal Fibroblast and Aortic Smooth Muscle Cell Proliferation

The polypeptide of interest is added to cultures of normal human dermal fibroblasts (NHDF) and human aortic smooth muscle cells (AoSMC) and two co-assays are performed with each sample. The first assay examines the effect of the polypeptide of interest on the proliferation of normal human dermal fibroblasts (NHDF) or aortic smooth muscle cells (AoSMC). Aberrant growth of fibroblasts or smooth muscle cells is a part of several pathological processes, including fibrosis, and restenosis. The second assay examines IL6 production by both NHDF and SMC. IL6 production is an indication of functional activation. Activated cells will have increased production of a number of cytokines and other factors, which can result in a proinflammatory or immunomodulatory outcome. Assays are run with and without co-TNFa stimulation, in order to check for costimulatory or inhibitory activity.

Briefly, on day 1, 96-well black plates are set up with 1000 cells/well (NHDF) or 2000 cells/well (AoSMC) in 100 μl culture media. NHDF culture media contains: Clonetics FB basal media, 1mg/ml hFGF, 5mg/ml insulin, 50mg/ml gentamycin, 2%FBS, while AoSMC culture media contains Clonetics SM basal media, 0.5 μg/ml hEGF, 5mg/ml insulin, 1μg/ml hFGF, 50mg/ml gentamycin, 50 μg/ml Amphotericin B, 5%FBS. After incubation at 37°C for at least 4-5 hours, culture media is aspirated and replaced with growth arrest media. Growth arrest media for NHDF contains fibroblast basal media, 50mg/ml gentamycin, 2% FBS, while growth arrest media for AoSMC contains SM basal media, 50mg/ml gentamycin, 50μg/ml Amphotericin B, 0.4% FBS. Incubate at 37°C until day 2.

On day 2, serial dilutions and templates of the polypeptide of interest are designed such that they always include media controls and known-protein controls. For both stimulation and inhibition experiments, proteins are diluted in growth arrest media. For inhibition experiments, TNFa is added to a final concentration of 2ng/ml (NHDF) or 5ng/ml (AoSMC). Add 1/3 vol media containing controls or polypeptides of the present invention and incubate at 37°C/5% CO_2 until day 5.

Transfer 60µl from each well to another labeled 96-well plate. cover with a plate-sealer. and store at 4°C until Day 6 (for IL6 ELISA). To the remaining 100 µl in the cell culture plate, aseptically add Alamar Blue in an amount equal to 10% of the culture volume (10µl). Return plates to incubator for 3 to 4 hours. Then measure fluorescence with excitation at 530nm and emission at 590nm using the CytoFluor. This yields the growth stimulation/inhibition data.

On day 5, the IL6 ELISA is performed by coating a 96 well plate with 50-100 ul/well of Anti-Human IL6 Monoclonal antibody diluted in PBS, pH 7.4, incubate ON at room temperature.

On day 6, empty the plates into the sink and blot on paper towels. Prepare Assay Buffer containing PBS with 4% BSA. Block the plates with 200 µl/well of Pierce Super Block blocking buffer in PBS for 1-2 hr and then wash plates with wash buffer (PBS, 0.05% Tween-20). Blot plates on paper towels. Then add 50 µl/well of diluted Anti-Human IL-6 Monoclonal, Biotin-labeled antibody at 0.50 mg/ml. Make dilutions of IL-6 stock in media (30, 10, 3, 1, 0.3, 0 ng/ml). Add duplicate samples to top row of plate. Cover the plates and incubate for 2 hours at RT on shaker. Plates are washed with wash buffer and blotted on paper towels. Dilute EU-labeled Streptavidin 1:1000 in Assay buffer, and add 100 µl/well. Cover the plate and incubate 1 h at RT. Plates are again washed with wash buffer and blotted on paper towels. Add 100 µl/well of Enhancement Solution and shake for 5 minutes. Read the plate on the Wallac DELFIA Fluorometer. Readings from triplicate samples in each assay are tabulated and averaged.

A positive result in this assay suggests AoSMC cell proliferation and that the polypeptide of the present invention may be involved in dermal fibroblast proliferation and/or smooth muscle cell proliferation. A positive result also suggests many potential uses of polypeptides, polynucleotides, agonists and/or antagonists of the polynucleotide/polypeptide of the present invention which gives a positive result. For example, inflammation and immune responses, wound healing, and angiogenesis, as detailed throughout this specification. Particularly, polypeptides of the present invention and polynucleotides of the present invention may be used in wound healing

and dermal regeneration. as well as the promotion of vasculargenesis. both of the blood vessels and lymphatics. The growth of vessels can be used in the treatment of, for example, cardiovascular diseases. Additionally, antagonists of polypeptides and polynucleotides of the invention may be useful in treating diseases, disorders, and/or conditions which involve angiogenesis by acting as an anti-vascular (e.g., anti-angiogenesis). These diseases, disorders, and/or conditions are known in the art and/or are described herein, such as, for example, malignancies, solid tumors, benign tumors, for example hemangiomas, acoustic neuromas, neurofibromas, trachomas, and pyogenic granulomas; artheroscleric plaques; ocular angiogenic diseases, for example, diabetic retinopathy, retinopathy of prematurity, macular degeneration, corneal graft rejection, neovascular glaucoma, retrolental fibroplasia, rubeosis, retinoblastoma, uvietis and Pterygia (abnormal blood vessel growth) of the eye; rheumatoid arthritis; psoriasis; delayed wound healing; endometriosis; vasculogenesis; granulations; hypertrophic scars (keloids); nonunion fractures; scleroderma; trachoma; vascular adhesions; myocardial angiogenesis; coronary collaterals; cerebral collaterals; arteriovenous malformations; ischemic limb angiogenesis; Osler-Webber Syndrome; plaque neovascularization; telangiectasia; hemophiliac joints; angiofibroma; fibromuscular dysplasia; wound granulation; Crohn's disease; and atherosclerosis. Moreover, antagonists of polypeptides and polynucleotides of the invention may be useful in treating anti-hyperproliferative diseases and/or anti-inflammatory known in the art and/or described herein.

One skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides (e.g., gene therapy), antibodies, agonists, and/or antagonists and fragments and variants thereof.

Example 45: Cellular Adhesion Molecule (CAM) Expression on Endothelial Cells

The recruitment of lymphocytes to areas of inflammation and angiogenesis involves specific receptor-ligand interactions between cell surface adhesion molecules

(CAMs) on lymphocytes and the vascular endothelium. The adhesion process, in both normal and pathological settings, follows a multi-step cascade that involves intercellular adhesion molecule-1 (ICAM-1), vascular cell adhesion molecule-1 (VCAM-1), and endothelial leukocyte adhesion molecule-1 (E-selectin) expression on endothelial cells (EC). The expression of these molecules and others on the vascular endothelium determines the efficiency with which leukocytes may adhere to the local vasculature and extravasate into the local tissue during the development of an inflammatory response. The local concentration of cytokines and growth factor participate in the modulation of the expression of these CAMs.

Briefly, endothelial cells (e.g., Human Umbilical Vein Endothelial cells (HUVECs)) are grown in a standard 96 well plate to confluence, growth medium is removed from the cells and replaced with 100 µl of 199 Medium (10% fetal bovine serum (FBS)). Samples for testing and positive or negative controls are added to the plate in triplicate (in 10 µl volumes). Plates are then incubated at 37°C for either 5 h (selectin and integrin expression) or 24 h (integrin expression only). Plates are aspirated to remove medium and 100 µl of 0.1% paraformaldehyde-PBS(with Ca++ and Mg++) is added to each well. Plates are held at 4°C for 30 min. Fixative is removed from the wells and wells are washed 1X with PBS(+Ca,Mg) + 0.5% BSA and drained. 10 µl of diluted primary antibody is added to the test and control wells. Anti-ICAM-1-Biotin, Anti-VCAM-1-Biotin and Anti-E-selectin-Biotin are used at a concentration of 10 µg/ml (1:10 dilution of 0.1 mg/ml stock antibody). Cells are incubated at 37°C for 30 min. in a humidified environment. Wells are washed three times with PBS(+Ca,Mg) + 0.5% BSA. 20 µl of diluted ExtrAvidin-Alkaline Phosphotase (1:5,000 dilution, refered to herein as the working dilution) are added to each well and incubated at 37°C for 30 min. Wells are washed three times with PBS(+Ca,Mg)+0.5% BSA. Dissolve 1 tablet of p-Nitrophenol Phosphate pNPP per 5 ml of glycine buffer (pH 10.4). 100 µl of pNPP substrate in glycine buffer is added to each test well. Standard wells in triplicate are prepared from the working dilution of the ExtrAvidin-Alkaline Phosphotase in glycine buffer: 1:5,000 (10^{0}) > $10^{-0.5}$ > 10^{-1} > $10^{-1.5}$. 5 µl of each dilution is added to triplicate wells and the resulting AP content in

each well is 5.50 ng, 1.74 ng, 0.55 ng, 0.18 ng. 100 µl of pNNP reagent is then added to each of the standard wells. The plate is incubated at 37°C for 4h. A volume of 50 µl of 3M NaOH is added to all wells. The plate is read on a plate reader at 405 nm using the background subtraction option on blank wells filled with glycine buffer only. Additionally, the template is set up to indicate the concentration of AP-conjugate in each standard well [5.50 ng; 1.74 ng; 0.55 ng; 0.18 ng]. Results are indicated as amount of bound AP-conjugate in each sample.

Example 46: Alamar Blue Endothelial Cells Proliferation Assay

This assay may be used to quantitatively determine protein mediated inhibition of bFGF-induced proliferation of Bovine Lymphatic Endothelial Cells (LECs), Bovine Aortic Endothelial Cells (BAECs) or Human Microvascular Uterine Myometrial Cells (UTMECs). This assay incorporates a fluorometric growth indicator based on detection of metabolic activity. A standard Alamar Blue Proliferation Assay is prepared in EGM-2MV with 10 ng /ml of bFGF added as a source of endothelial cell stimulation. This assay may be used with a variety of endothelial cells with slight changes in growth medium and cell concentration. Dilutions of the protein batches to be tested are diluted as appropriate. Serum-free medium (GIBCO SFM) without bFGF is used as a non-stimulated control and Angiostatin or TSP-1 are included as a known inhibitory controls.

Briefly, LEC, BAECs or UTMECs are seeded in growth media at a density of 5000 to 2000 cells/well in a 96 well plate and placed at 37-C overnight. After the overnight incubation of the cells, the growth media is removed and replaced with GIBCO EC-SFM. The cells are treated with the appropriate dilutions of the protein of interest or control protein sample(s) (prepared in SFM) in triplicate wells with additional bFGF to a concentration of 10 ng/ ml. Once the cells have been treated with the samples, the plate(s) is/are placed back in the 37° C incubator for three days. After three days 10 ml of stock alamar blue (Biosource Cat# DAL1100) is added to each well and the plate(s) is/are placed back in the 37°C incubator for four hours. The

plate(s) are then read at 530nm excitation and 590nm emission using the CytoFluor fluorescence reader. Direct output is recorded in relative fluorescence units.

Alamar blue is an oxidation-reduction indicator that both fluoresces and changes color in response to chemical reduction of growth medium resulting from cell growth. As cells grow in culture, innate metabolic activity results in a chemical reduction of the immediate surrounding environment. Reduction related to growth causes the indicator to change from oxidized (non-fluorescent blue) form to reduced (fluorescent red) form. i.e. stimulated proliferation will produce a stronger signal and inhibited proliferation will produce a weaker signal and the total signal is proportional to the total number of cells as well as their metabolic activity. The background level of activity is observed with the starvation medium alone. This is compared to the output observed from the positive control samples (bFGF in growth medium) and protein dilutions.

Example 47: Detection of Inhibition of a Mixed Lymphocyte Reaction

This assay can be used to detect and evaluate inhibition of a Mixed Lymphocyte Reaction (MLR) by gene products (e.g., isolated polypeptides). Inhibition of a MLR may be due to a direct effect on cell proliferation and viability, modulation of costimulatory molecules on interacting cells, modulation of adhesiveness between lymphocytes and accessory cells, or modulation of cytokine production by accessory cells. Multiple cells may be targeted by these polypeptides since the peripheral blood mononuclear fraction used in this assay includes T, B and natural killer lymphocytes, as well as monocytes and dendritic cells.

Polypeptides of interest found to inhibit the MLR may find application in diseases associated with lymphocyte and monocyte activation or proliferation. These include, but are not limited to, diseases such as asthma, arthritis, diabetes, inflammatory skin conditions, psoriasis, eczema, systemic lupus erythematosus, multiple sclerosis, glomerulonephritis, inflammatory bowel disease. crohn's disease, ulcerative colitis. arteriosclerosis, cirrhosis, graft vs. host disease. host vs. graft

disease. hepatitis. leukemia and lymphoma.

Briefly. PBMCs from human donors are purified by density gradient centrifugation using Lymphocyte Separation Medium (LSM®, density 1.0770 g/ml, Organon Teknika Corporation, West Chester, PA). PBMCs from two donors are adjusted to 2 x 10^6 cells/ml in RPMI-1640 (Life Technologies, Grand Island, NY) supplemented with 10% FCS and 2 mM glutamine. PBMCs from a third donor is adjusted to 2 x 10^5 cells/ml. Fifty microliters of PBMCs from each donor is added to wells of a 96-well round bottom microtiter plate. Dilutions of test materials (50 μl) is added in triplicate to microtiter wells. Test samples (of the protein of interest) are added for final dilution of 1:4; rhuIL-2 (R&D Systems, Minneapolis, MN, catalog number 202-IL) is added to a final concentration of 1 μg/ml; anti-CD4 mAb (R&D Systems, clone 34930.11, catalog number MAB379) is added to a final concentration of 10 μg/ml. Cells are cultured for 7-8 days at 37°C in 5% CO_2, and 1 μC of [^{3}H] thymidine is added to wells for the last 16 hrs of culture. Cells are harvested and thymidine incorporation determined using a Packard TopCount. Data is expressed as the mean and standard deviation of triplicate determinations.

Samples of the protein of interest are screened in separate experiments and compared to the negative control treatment, anti-CD4 mAb, which inhibits proliferation of lymphocytes and the positive control treatment, IL-2 (either as recombinant material or supernatant), which enhances proliferation of lymphocytes.

One skilled in the art could easily modify the exemplified studies to test the activity of polynucleotides (e.g., gene therapy), antibodies, agonists, and/or antagonists and fragments and variants thereof.

It will be clear that the invention may be practiced otherwise than as particularly described in the foregoing description and examples. Numerous modifications and variations of the present invention are possible in light of the above teachings and, therefore, are within the scope of the appended claims.

The entire disclosure of each document cited (including patents, patent applications, journal articles, abstracts, laboratory manuals. books, or other disclosures) in the Background of the Invention. Detailed Description. and Examples

is hereby incorporated herein by reference. Further, the hard copy of the sequence listing submitted herewith and the corresponding computer readable form are both incorporated herein by reference in their entireties. Moreover, the hard copy of and the corresponding computer readable form of the Sequence Listing of Serial No. 60/124,270 are also incorporated herein by reference in their entireties.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209059

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209059

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209059

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209060

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209060

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209060

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209061

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209061

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209061

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209062

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209062

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209062

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209063

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209063

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209063

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209064

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209064

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209064

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209065

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209065

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209065

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209066

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

Form PCT/RO/134 (July 1992)

ATCC Deposit No.: 209066

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209066

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209067

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209067

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209067

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209068

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209068

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations). or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209068

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
20 May 1997	209069

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209069

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209069

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
12 January 1998	209579

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209579

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209579

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas. Virginia 20110-2209
United States of America

Date of deposit	Accession Number
12 January 1998	209578

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 209578

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 209578

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
16 July 1998	203067

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 203067

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 203067

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
16 July 1998	203068

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 203068

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 203068

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
01 February 1999	203609

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 203609

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 203609

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
01 February 1999	203610

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

Form PCT/RO/134 (July 1992)

ATCC Deposit No.: 203610

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 203610

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
17 November 1998	203485

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: 203485

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: 203485

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that. until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
18 June 1999	PTA-252

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: PTA-252

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: PTA-252

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
18 June 1999	PTA-253

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: PTA-253

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: PTA-253

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

Applicant's or agent's file reference number	PA102PCT	International application No.	UNASSIGNED

INDICATIONS RELATING TO A DEPOSITED MICROORGANISM

(PCT Rule 13*bis*)

A. The indications made below relate to the microorganism referred to in the description on page 91, line N/A.

B. IDENTIFICATION OF DEPOSIT — Further deposits are identified on an additional sheet ☐

Name of depositary institution American Type Culture Collection

Address of depositary institution *(including postal code and country)*
10801 University Boulevard
Manassas, Virginia 20110-2209
United States of America

Date of deposit	Accession Number
22 December 1999	PTA-1081

C. ADDITIONAL INDICATIONS *(leave blank if not applicable)* — This information is continued on an additional sheet ☐

D. DESIGNATED STATES FOR WHICH INDICATIONS ARE MADE *(if the indications are not for all designated States)*

Europe
In respect to those designations in which a European Patent is sought a sample of the deposited microorganism will be made available until the publication of the mention of the grant of the European patent or until the date on which application has been refused or withdrawn or is deemed to be withdrawn, only by the issue of such a sample to an expert nominated by the person requesting the sample (Rule 28 (4) EPC).

E. SEPARATE FURNISHING OF INDICATIONS *(leave blank if not applicable)*

The indications listed below will be submitted to the International Bureau later *(specify the general nature of the indications e.g., "Accession Number of Deposit")*

For receiving Office use only	For International Bureau use only
☐ This sheet was received with the international application	☐ This sheet was received by the International Bureau on:
Authorized officer	Authorized officer

ATCC Deposit No.: PTA-1081

CANADA

The applicant requests that, until either a Canadian patent has been issued on the basis of an application or the application has been refused, or is abandoned and no longer subject to reinstatement, or is withdrawn, the Commissioner of Patents only authorizes the furnishing of a sample of the deposited biological material referred to in the application to an independent expert nominated by the Commissioner, the applicant must, by a written statement, inform the International Bureau accordingly before completion of technical preparations for publication of the international application.

NORWAY

The applicant hereby requests that the application has been laid open to public inspection (by the Norwegian Patent Office), or has been finally decided upon by the Norwegian Patent Office without having been laid open inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Norwegian Patent Office not later than at the time when the application is made available to the public under Sections 22 and 33(3) of the Norwegian Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on the list of recognized experts drawn up by the Norwegian Patent Office or any person approved by the applicant in the individual case.

AUSTRALIA

The applicant hereby gives notice that the furnishing of a sample of a microorganism shall only be effected prior to the grant of a patent, or prior to the lapsing, refusal or withdrawal of the application, to a person who is a skilled addressee without an interest in the invention (Regulation 3.25(3) of the Australian Patents Regulations).

FINLAND

The applicant hereby requests that, until the application has been laid open to public inspection (by the National Board of Patents and Regulations), or has been finally decided upon by the National Board of Patents and Registration without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art.

UNITED KINGDOM

The applicant hereby requests that the furnishing of a sample of a microorganism shall only be made available to an expert. The request to this effect must be filed by the applicant with the International Bureau before the completion of the technical preparations for the international publication of the application.

ATCC Deposit No.: PTA-1081

DENMARK

The applicant hereby requests that, until the application has been laid open to public inspection (by the Danish Patent Office), or has been finally decided upon by the Danish Patent office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the Danish Patent Office not later that at the time when the application is made available to the public under Sections 22 and 33(3) of the Danish Patents Act. If such a request has been filed by the applicant, any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Danish Patent Office or any person by the applicant in the individual case.

SWEDEN

The applicant hereby requests that, until the application has been laid open to public inspection (by the Swedish Patent Office), or has been finally decided upon by the Swedish Patent Office without having been laid open to public inspection, the furnishing of a sample shall only be effected to an expert in the art. The request to this effect shall be filed by the applicant with the International Bureau before the expiration of 16 months from the priority date (preferably on the Form PCT/RO/134 reproduced in annex Z of Volume I of the PCT Applicant's Guide). If such a request has been filed by the applicant any request made by a third party for the furnishing of a sample shall indicate the expert to be used. That expert may be any person entered on a list of recognized experts drawn up by the Swedish Patent Office or any person approved by a applicant in the individual case.

NETHERLANDS

The applicant hereby requests that until the date of a grant of a Netherlands patent or until the date on which the application is refused or withdrawn or lapsed, the microorganism shall be made available as provided in the 31F(1) of the Patent Rules only by the issue of a sample to an expert. The request to this effect must be furnished by the applicant with the Netherlands Industrial Property Office before the date on which the application is made available to the public under Section 22C or Section 25 of the Patents Act of the Kingdom of the Netherlands, whichever of the two dates occurs earlier.

What Is Claimed Is:

1. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95% identical to a sequence selected from the group consisting of:

(a) a polynucleotide fragment of SEQ ID NO:X or a polynucleotide fragment of the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X;

(b) a polynucleotide encoding a polypeptide fragment of SEQ ID NO:Y or a polypeptide fragment encoded by the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X;

(c) a polynucleotide encoding a polypeptide fragment of a polypeptide encoded by SEQ ID NO:X or a polypeptide fragment encoded by the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X;

(d) a polynucleotide encoding a polypeptide domain of SEQ ID NO:Y or a polypeptide domain encoded by the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X;

(e) a polynucleotide encoding a polypeptide epitope of SEQ ID NO:Y or a polypeptide epitope encoded by the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X;

(f) a polynucleotide encoding a polypeptide of SEQ ID NO:Y or the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X, having biological activity;

(g) a polynucleotide which is a variant of SEQ ID NO:X;

(h) a polynucleotide which is an allelic variant of SEQ ID NO:X;

(i) a polynucleotide which encodes a species homologue of the SEQ ID NO:Y;

(j) a polynucleotide capable of hybridizing under stringent conditions to any one of the polynucleotides specified in (a)-(i), wherein said polynucleotide does not hybridize under stringent conditions to a nucleic acid molecule having a nucleotide

sequence of only A residues or of only T residues.

2. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises a nucleotide sequence encoding a protein.

3. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises a nucleotide sequence encoding the sequence identified as SEQ ID NO:Y or the polypeptide encoded by the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X.

4. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises the entire nucleotide sequence of SEQ ID NO:X or the cDNA sequence included in the related cDNA clone, which is hybridizable to SEQ ID NO:X.

5. The isolated nucleic acid molecule of claim 2, wherein the nucleotide sequence comprises sequential nucleotide deletions from either the C-terminus or the N-terminus.

6. The isolated nucleic acid molecule of claim 3, wherein the nucleotide sequence comprises sequential nucleotide deletions from either the C-terminus or the N-terminus.

7. A recombinant vector comprising the isolated nucleic acid molecule of claim 1.

8. A method of making a recombinant host cell comprising the isolated nucleic acid molecule of claim 1.

9. A recombinant host cell produced by the method of claim 8.

10. The recombinant host cell of claim 9 comprising vector sequences.

11. An isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence selected from the group consisting of:

(a) a polypeptide fragment of SEQ ID NO:Y or of the sequence encoded by the cDNA included in the related cDNA clone;

(b) a polypeptide fragment of SEQ ID NO:Y or of the sequence encoded by the cDNA included in the related cDNA clone, having biological activity;

(c) a polypeptide domain of SEQ ID NO:Y or of the sequence encoded by the cDNA included in the related cDNA clone;

(d) a polypeptide epitope of SEQ ID NO:Y or of the sequence encoded by the cDNA included in the related cDNA clone;

(e) a full length protein of SEQ ID NO:Y or of the sequence encoded by the cDNA included in the related cDNA clone;

(f) a variant of SEQ ID NO:Y;

(g) an allelic variant of SEQ ID NO:Y; or

(h) a species homologue of the SEQ ID NO:Y.

12. The isolated polypeptide of claim 11, wherein the full length protein comprises sequential amino acid deletions from either the C-terminus or the N-terminus.

13. An isolated antibody that binds specifically to the isolated polypeptide of claim 11.

14. A recombinant host cell that expresses the isolated polypeptide of claim 11.

15. A method of making an isolated polypeptide comprising:

(a) culturing the recombinant host cell of claim 14 under conditions such that said polypeptide is expressed; and

(b) recovering said polypeptide.

16. The polypeptide produced by claim 15.

17. A method for preventing, treating, or ameliorating a medical condition, comprising administering to a mammalian subject a therapeutically effective amount of the polypeptide of claim 11 or the polynucleotide of claim 1.

18. A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or absence of a mutation in the polynucleotide of claim 1; and

(b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or absence of said mutation.

19. A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or amount of expression of the polypeptide of claim 11 in a biological sample; and

(b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or amount of expression of the polypeptide.

20. A method for identifying a binding partner to the polypeptide of claim 11 comprising:

(a) contacting the polypeptide of claim 11 with a binding partner; and

(b) determining whether the binding partner effects an activity of the polypeptide.

21. The gene corresponding to the cDNA sequence of SEQ ID NO:Y.

22. A method of identifying an activity in a biological assay, wherein the method comprises:

(a) expressing SEQ ID NO:X in a cell:

(b) isolating the supernatant;

(c) detecting an activity in a biological assay; and

(d) identifying the protein in the supernatant having the activity.

23. The product produced by the method of claim 20.

SEQUENCE LISTING

<110> Craig Rosen,
Steve Ruben

<120> Human Colon Cancer Associated Gene Sequences and Polypeptides

<130> PA102PCT

<140> Usassigned
<141> 2000-03-08

<150> 60/124,270
<151> 1999-03-12

<160> 1556

<170> PatentIn Ver. 2.0

<210> 1
<211> 633
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (206)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (606)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (616)
<223> n equals a,t,g, or c

<400> 1
```
gcaggatgag ctacaggaag aatcagaaat gtcagaaaaa aagtcatgct cctcttctcc 60
cacccaaagt gagatatcca catcgctgcc tccagataga caaaggagaa aaagggagct 120
tcgcaccttt tcattttctg acgatgaaaa taaacctcct tcaccaaagg aaataaggat 180
cgaagttgct gaaggcttca cctggnacag taacccсttg aagtggagtg tggcagacgt 240
tgtgcggttc atcagatcca ctgactgtgc ctccattagc aagaatattc ctwgaccagg 300
aaattgatgg gcaggccctg ttgctcctta cccttcccac tgttcaagaa tgcatggact 360
taaaattggg ccctgcatca aactttgcca tcacatagag aggrtcaagt ttgcttttta 420
tgagcagttt gccaactgag aaggacaacc aaagtgagct gggatctttg aaggcacaaa 480
tgcaggcaaa tccttcaccc tgctttatta agtgggagct gggaatagtc ctgggggct 540
tctgggggcc ttgcagggta ttcagctttg ctctcttttg gcacttttcg gggggaaggg 600
aggganttca cagttnaggg gaaggccaaa aac                                633
```

<210> 2
<211> 295
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (147)
<223> n equals a,t,g, or c

<400> 2
agcggcacga gcggcacgag aagccctact cggatggggc acggactgtc caccttttct 60
aatgtgtgtt gtcagcctgt gctgtggcat agacatggat gcaaggacca ctttggagac 120
tggggtggcc tcaagagcac acagagnaag ggaagaaggg gccatcacag gatgccagcc 180
cctgcctggg ttgggggcac tcagccacgg accagcccct tcctgggtat ttattctcta 240
tttattgggg gataggagaa gaggcattct rcctgggtgg gacaaacccc tttaa 295

<210> 3
<211> 442
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (422)
<223> n equals a,t,g, or c

<400> 3
aattcggcag agagagctgc tcagttagga cccagaggga accatggaaa ccccagcgca 60
ttkctyttcc tcctgctact ctggctccca gatattaccg cagaaattgt gttgacgcat 120
ttccagacac cctgtctttg tctcctgggg aaagagccac cctctcctgc aggaccagtc 180
agagtgttgg cagcaacttc ttaacctggt atgaacaaaa atctggccag tytcccaggc 240
tcctcatgtt tggtaactcc cgcagsccac tggcatccca gacagggtca gtggcagtgg 300
gtctgggaca gayttcacty tcaccatcag cagactggag gytgaagatt ttgcagtgta 360
ttwctgttca acaatwtngg tttcgttcaa caatgtttca atttgggcc aggggccma 420
gnttggaaty aaaggactgt gg 442

<210> 4
<211> 754
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (446)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (662)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (700)
<223> n equals a,t,g, or c

<400> 4
tccgaagtcg gggaccctcc taccacctgt agagaagcgg gagtggatct aaaataaaat 60
ccaggawtct ggggg ttcct agacggagcc agayttcgga agggtgtcct gctactcctg 120
ctggggctcc tccaggacaa gggcacacaa ctggttccgt taagcccctc tytcgctcag 180
acgccatgga gctggatctg tctccacctc atcttagcag ctctccggaa gacctttgcc 240
cagcccctgg aacccctcct ggaactcccc ggccccctga tacccctctg cctgaggagg 300
taaagaggtc ccagcctctc ctcatcccaa ccaccggcag gaaacttcga gaggaggaga 360
ggcgtgccac ctccctcccc tctatcccca acccсttccc tgagctctgc agtcctccct 420
cacagagccc cattctcggg ggcccntcca gtgcaagggg gctgctcccc gcgaatgcca 480
gccgccccca tgtagtaaag gtgtacagtg aggatggggc ctgcagtctg tggaggtggc 540
agcaggtgcc acagytcgcc acgtgtgtga aatgctggtg cacgagctma sgcttgagcg 600
acgagacctg gggg tttgtg gagtgccacc ccaactagca tggagcgggt tttgaggacc 660
angatccctg ttgaagtgca gttgctggcc ctgggggagn tagccgttcg tttccggaaa 720
tttggcaagt aggattttta aggttccaaa ttct 754

<210> 5
<211> 393
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (273)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (274)
<223> n equals a,t,g, or c

<400> 5
ttttctcttt gatgttctgg ccctgacttc tgaaaccagt gttctgggga gaggcatttg 60
agagtgaccc agggcctggg aaccggggct tttctcggtg gtcttaggcc tgttctgcaa 120
ccaaggcaag gccaggattt ccggaaatat gaggaaggct ttgaccccta ctctatgttc 180
accccagagc agatcatggg gaaggatgtc cggctcctac gcatcaagaa ggagggatcc 240
ttagacctgg ccctggaagg cggtgtggac tcnnccattg ggaaggtggt cgtttctgct 300
gtgtatgagc ggggagctgc tgagcggcat ggtggcattg tgaaagggga cgagatcatg 360
gcaatcaacg gcaagattgt gacagattac acc 393

<210> 6
<211> 539
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (486)
<223> n equals a,t,g, or c

<400> 6
gctcgtgccg ctgaaatgac ttccacggct gggacgggaa ccttccaccc acagctatgc 60
ctctgattgg tgaatggtga aggtgcctgt ctaacttttc tgtaaaaaga accagctgcc 120
tccaggcagc magccctcaa gcatcactta caggaccaga gggacaagac atgactgtga 180
tgaggagctg ctttcgccaa tttaacacca agaagaattg aggctgcttg ggaggaaggc 240
caggaggaac acgagactga gagatgaatt ttcaacagag gctgcaaagc tgtggacttt 300
agccagaccc ttctgccctc ctttgctggc gacacttctt caaatgcaga tggttgtgct 360
cccttgcctg ggttttaccc tgcttctytg gagccaggta tcaggggccc agggccaaga 420
attccacttt gggccctgcc aagtgaaggg ggttgttccc cagaaamtkt gggaagsctt 480
ctgggntgtg aaagacayta tgcaagytca ggwtaacatc asgrgtsccc ggttgttgc 539

<210> 7
<211> 804
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (758)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (759)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (771)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (802)
<223> n equals a,t,g, or c

<400> 7
aattcggcac gagttcaaca ccaagtgtcc ctctggcagt tgtgtgatga atcagtatct 60
gagttcaaaa ttcccaaagg atttcagtac atcttgccgt gcacattttg aaagatacct 120
tttatctcag aaaccaaagt gcctgctgca agcacctatt cctacaaata taatgacaac 180
accagtgtgt gggaaccacc ttctagaagt gggagaagac tgtgattgtg gctctcctaa 240

ggagtgtacc aatctctgct gtgaagccct aacgtgtaaa ctgaagcctg gaactgattg 300
cggaggagat gctccaaacc ataccacaga gtgaatccaa aagtctgctt cactgagatg 360
ctaccttgcc aggacaagaa ccaagaacty taactgtccc aggaatcttg tgaattttca 420
cccataatgg tctttcactt gtcattctac tttctatatt gttatcagtc caggaaacag 480
gtaaacagat gtaattagag acattggctc tttgtttagg cctaatcttt ctttttactt 540
tttttttctt ttttcttttt ttttaaagat catgaatttg tgacttagtt ctgcccyttg 600
gagaacaaaa gaaagcagtc ttccatcaaa tcaccttaaa atgcacggct aaactattca 660
gagttaacac tccagaattg ttaaattaca agtactatgc tttaatgctt ctttcatctt 720
actagtaagg cctattaaaa aaaataatac cacttganng gtgaaggctt ngcaatagga 780
agaagataga atccaggttt angg 804

<210> 8
<211> 720
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (714)
<223> n equals a,t,g, or c

<400> 8
gtgaggacag cctgccagag tctggtctct ggacactatg ggcacacgac tcctcccagc 60
tctgtttctt gtcctcctgg tattgggatt tgccccacgg gctctcctga cacactctcc 120
ccctgcagag gtccagggga cccaacagcc ccagcaagat gagatgccta gcccgacctt 180
cctcacccag gtgaaggaat ctctctccag ttactgggag tcagcaaaga cagccgccca 240
gaacctgtac gagaagacat acctgcccgc tgtagatgag aaactcaggg acttgtacag 300
caaaagcaca gcagccatga gcacttacac aggcattttt actgaccaag ttctttctgt 360
gctgaaggga gaggagtaac agccagaccc cccatcagtg gacaagggga gagtccccta 420
ctcccctgat cccccaggtt cagactgagc tccccccttcc cagtagctct tgcatcctcc 480
tcccaactct agcctgaatt cttttcaata aaaaatacaa ttcaagttgc ttctcatgga 540
tggcactgct tttctgagga ctcaaggtgc caagatggag ggctgactc agtccagcca 600
acatttaatg agcacctact ttatgtatgg agctctaacc catgggtcca tgggaataaa 660
gcagtgaata gtaacaataa ataattgtaa cagcaaaaaa aaaaaaaaaa aaanaaaaaa 720

<210> 9
<211> 540
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (463)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (524)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (535)
<223> n equals a,t,g, or c

<400> 9
ccaacagaga tgtatccaga gatccacagt tctggaggct gagaagtcta aaatcaaggc 60
accagcagat tccacatctc gtgaaggctc actctctgct tcacagatgg cactgtcttg 120
ctgtgttctc acatggcaga aggggcaaac aagccccct gggcctcttt tataaaggca 180
ctaactctat gcctaaaggc agggccctca tgactctatc acctaccaaa aggctccact 240
tctttatact attggagggg tagaaggaac ttcctttcta gaccttgaag gtttaagaat 300
ttgaatctat aaaacaagct gacaatagac agattaacag gagaaaaagc atatacattt 360
tttaatgtgg gccagatggc agaagcttaa ataacacccc aagctacagg gaagtgaggc 420
ctctgatggg ggaggtagtt gacacaggct gtggggaggg gtnaggggga ggaatctgtg 480
gtggagcaaa tttgccttat tacactgata aatggtaatt tacnctaatt aagcntgggt 540

<210> 10
<211> 561
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (406)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (450)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (546)
<223> n equals a,t,g, or c

<400> 10
agaatgtcac tgagtggcct gaaccaaagc tcatggatac tggagatgaa gaaccagcag 60
gagaccccag gtgtgctctc atccgtactc tgtgacaccc cttagtggac tgttccaacc 120
agttgggccc gggagaagga ctagggaagc ttccttccca tctgcacctc ccagcctgga 180
gaggagcctg tgacttgccc tgttccttgg ctcctcaggc tggggtaagg tgtgggggtg 240
gctccagcct tgaggccagt ctcctgatgc tggattcctt gttttccctg caggcatcaa 300
acagaaaggc cttttgctaa gtagcagcct gatgcactcc gagtcagagc tggacagcga 360
tgatgccatc tttacatggc cagaccgaga gaagggcaaa ctcctngcat ggtcagaatg 420
gctctgtacc caacgggcag acccctctgn aaggccagga gcccgcggga rgagatcctg 480
tagccacctg gtctgtctyc tcagggcarg gccaggcaca attgcccggc cagttcttct 540
aacttnccga gttttgcggg g 561

<210> 11
<211> 393
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (346)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (381)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (383)
<223> n equals a,t,g, or c

<400> 11
tcgacccacg cgtccgggtg agtgccatct taaaacttac tggagattgg ttttatattt 60
agatttatat aactggttat gtgaatatat ttaaatactg gggaaattgc ttcactgtct 120
tagaaccaag caagattcac ctgtgttttg tgttcatgtt catttgcctc ttaaaggcaa 180
gggttgaaga taaataaggt agcaatgtct atagttttgg ccttaactat gccaatctaa 240
ttataattcc ctgtatttaa aatggtttct tttacttatt gaaaggcatt ttagtgtggt 300
ktatgtgtaa tattaaagat tattcaacac ctctcaraaa aaaaanraaa aaggggggcc 360
ccccctgggg gtcccaagct nancgtacgc ggg 393

<210> 12
<211> 322
<212> DNA
<213> Homo sapiens

<400> 12
taagaataca aaattagcca agcatgctgg cacatgcctg taatcccagc tactcgggag 60
gctgaggtac gagaatcgct tgaacctggg aggcagagga tgcagtgagc cgggatcacg 120
ccattgcact ccagcctggg ggacaagagt gaatctgtgt ctcaccaaaa aaaaaaagaa 180
aaagaaagat gcttaacaaa ggttaccata agccacaaat tcatraccac ttatccttcc 240
agtttcaagt agaatatatt cataacctca ataaagttct ccctgctccc aaaaaaaaaa 300
aaaaaaaaaa aaaaaaaaaa ag 322

<210> 13
<211> 1907
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1834)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1843)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1888)
<223> n equals a,t,g, or c

<400> 13
gagaaataat aatatagctt tatagaattt tccatcttgt attaaaataa tcacatgtac 60
atcattgtaa ctcagtccat aacataagat tttgtacaac aatttctttt tgtgtgctgg 120
catcattaag gtttagtctg cccagatcac ctattagtac ctaatttata tattctgaat 180
taaaattatc tgttaattta aaaacatttt atctattgtc tttcaaaata gtattaactg 240
agggtttttt tgtgtgtgtt tttctatttt gcttggcttt ttgaacatta ctggactctc 300
gttttagaag gaaaaacctt tcagctctac tctcacaatc ttatagcttt gtttgaacat 360
gccaaaaaac caggattagc tgcccatatt caaactcaca ggtttccaga ccgaatacta 420
ccaagaaaat tcgctttaac aacaaagatt cctgatacaa aaggctgcca caaatgttgc 480
atagtcagaa acccttacac gggacataaa tacctctgtg gagctttaca gtctggaatt 540
gttttacttc agtggtatga gccaatgcag aaattcatgt tgataaagca ctttgatttt 600
cctttgccaa gtcctttgaa tgtttttgaa atgctggtga tacctgaaca ggaataccct 660
atggtctgtg tagctattag caaaggcact gaatcgaatc aggtagttca gtttgagaca 720
atcaatttga actctgcatc ttcatggttt acagaaattg gtgcaggcag ccagcagtta 780
gattccattc atgtaacaca gttggagaga gataccgttt tagtgtgttt agacaaattt 840
gtgaaaattg taaatctaca aggaaaatta aaatcaagta agaaactggc ctctgagtta 900
agttttgatt ttcgcattga atctgtagta tgccttcaag acagtgtgtt ggctttctgg 960
aaacatggga tgcagggtaa aagcttcaag tcagatgagg ttacccagga gatttcagat 1020
gaaacaagag ttttccgctt attaggatca gacagggttg tcgttttgga aagtaggcca 1080
acagaaaatc ctactgcaca cagcaatctc tacatcttgg ctggacatga aaatagttac 1140
taagcaacag aaactgatct caaatgacag gaaaatgaat atactccatt gaaaggaaaa 1200
ataaggaaat tcaatacaaa ctgcactatg atttgcttta actattatgg gttatattgc 1260
aaatgatctg tactttaggg tagaattcaa tattttctgc agctggaaac agctagtcta 1320
tctcttgcca ctgtgtggtg gttatatcaa gtttgcttaa taaaagctat gagacaaata 1380
gtcctctagt tccaggaaac acagtctttt tttaaaaaaa acaatgtttg taacaagggt 1440
gccatggtat ttttagataa ctcgtgatta tcttaagaga ggtaaattta gtgatcattt 1500
tatatcatgt cttattcctt cttaatgaac ataatttgtt aaattctcaa gcaaggtttt 1560
cacttttata ttggccattc tgtatgtttt tgtaaaacag aatatttaat ccttatttat 1620
taatctcttg ctggagtggt gtaatgtatc taacttttag caaaggaggg ttgcagagca 1680
gcttaaattt tttttataat gtataagaat tttgtttatc ttttaagagt agtaaagtac 1740
tttgagtgtt tgggggtcaa cacacacatg caatttgctt aacaaaagta ttttataata 1800
cagttcatac agaataccyt aaaagggagc ytangtttcc acnacagata agtggtaagg 1860
gtcataccgg agataatgat gatagtgnaa tatcctagaa gggggtg 1907

<210> 14
<211> 1140
<212> DNA
<213> Homo sapiens

<400> 14
agaataaatt ccagggcttc agtctgcctt tggttcgcaa gtttgcccac tcgattctgc 60
agtgcttgga tgctttgcac aaaaacagaa taattcactg tgaccttaag cccgagaaca 120
ttttgttaaa gcagcagggt agaagcggta ttaaagtaat tgattttggc tccagttgtt 180
acgagcatca gcgtgtctac acgtacatcc agtcgcgttt ttaccgggct ccagaagtga 240

tccttggggc caggtatggc atgcccattg atatgtggag cctgggctgc attttagcag 300
agctcctgac gggttacccc ctcttgcctg gggaagatga aggggaccag ctggcctgta 360
tgattgaact gttgggcatg cctcacagaa actgctggat gcatccaaac gagccaaaaa 420
ttttgtgagc tccaagggtt atccccgtta ctgcactgtc acgactctct cagatggctc 480
tgtggtccta aacggaggcc gttcccggag gggaaactga ggggcccacc ggagagcaga 540
gagtggggka acgcgctgaa ggggtgtgat gatcccсttt tccttgactt cttaaaacag 600
tgtttagagt gggatcctgc agtgcgcatg accccaggcc aggctttgcg gcacccctgg 660
ctgaggaggc ggttgccaaa gcctcccacc ggggagaaaa cgtcatgaaa aggataactg 720
agagcaccgg tgctatcaca tctatatcca agttacctcc accttctagc tcagcttcca 780
aactgaggac taatttggcg cagatgacag atgccaatgg gaatattcag cagaggacag 840
tgttgccaaa acttgttagc tgagctcacg tcccctgatg ctggtaacct gaaagatacg 900
acattgctga gccttactgg gttgaaaagg agtagctcag acctgttttt atttgctcaa 960
taactctact catttgtatc ttttcagcac ttaattttaa tgtaagaaag ttgttcattt 1020
tgtttttata aaatacatga ggacaatgct ttaartttta aaaaaaaaaa aaaaaaaaaa 1080
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaagg gcggccgctc gcgatctaga 1140

<210> 15
<211> 2008
<212> DNA
<213> Homo sapiens

<400> 15
gccaggagac cctgaaacat gaaaccaaac aggctttgat attttttttt ttttaattac 60
tttccccttt tgcttgattc ttcttccttg gtatcatatt caaaggagga aagaatggat 120
gacacttagg gacaggtcac taagcagaat aggtattagt tggtttttta ttatttttaa 180
atttatatag ctctcatgta ttgaaggtgc tactttaaaa actgtgttaa tgtacttgca 240
aatctcctgc tggctcatga aacagcagaa ttccagccaa ggcaaattca gttggatcta 300
gggcttgaaa actgcccaag attaaagagc taagatgaaa tagtttgaat aaactggtaa 360
aataacaatt catactatct ctacatattt ttaggatatg aatttttttt tcctgctggg 420
tagattgtcc agtgacttat ggcatgaatt tcttttcatg ctaccttcaa tcttcaacta 480
aagatttcta aaaggggtaa gaaatgaggc agtagtttat taaatacata gaagtacaca 540
gctattatat gctgtggctt tgagaagtta acttttgtgg aatatgaaac caaaggaaga 600
atttccatgt agataaatta agaataggga aaaacatcta cctaaaagat ggttgtccct 660
aaaaaactgg aaacatctga aatgctctat ttatgttatt attcctggga gcttatagcc 720
cattattttt actttttttt tttaattcag aagactagaa cagaacttaa attttacaaa 780
cttttgatca taatgctttt gcccatactg tctcgtcctt agccccagtg acatgtgctg 840
atcctcctgc ctttagttct aaatggttct gaatagcttt aaaagatgaa taagaaaaaa 900
gatcaagctc ttttgaggct agagggctca tatggagatc taaaaccctc catgttcatt 960
tccagacttg gtcaggcaca tacatagtaa attataatca atcatgggaa ttacataagg 1020
ataatgaggc ccaactgaaa ccaagtttca gtctgcctta cctttacccg tccttgagaa 1080
cagcggtcca ggagaatcag gcagtctgtg gcctcctgta gcagggcgct cttaacagac 1140
tcaggtgtaa ggtttggatc ccttgctaca tcacaaatca gtttcaagag ggccttcagt 1200
aagaccacaa gtctgcagga aactctggaa tcaggaagaa aagctatgtt catactctaa 1260
atctggatat taaaattgga agagacttca aagactgtca agtggaaagc tatcatttcc 1320
taaattaagg aacttaggtc aaagttaaat gaaaaagacc taaaaacaga accaaagaca 1380
gcctctagat ttcttaccct caagtctcct gttagcatac tgcctataca cacagacaca 1440
ccctctgcca cactgctctc ttccttccag aagcttggtt ctactgtaag caacagctcc 1500
ttcatgggct gagaagggga aaccaggatc tccccaacca agggcctata cttttatttt 1560
tcaactctat taactgaact atgcttggag agagccctga atcctttaac tttaatgcca 1620
tcttaggcct ggaagttaga gtgagggaaa tgagcttggc ttctgggact gtgtcaagtt 1680
gaattttctg tcatttaatt tcagatccta gctcatcatc agtgaagtcc agcctactta 1740

cttgtaacta ttaacctttc taaaagtttt catcgccttg gtaaagctcc agaaatggac 1800
aatgctagtg actgcacaat attgtgactg tacttaatgc cactgaactg tacactttaa 1860
aatggaaaat ttatatgtat ttttaccaca ataaacaaaa aaccctaaaa aaactttaat 1920
gaaaggtgga aaataattta acttayaatg tgaaaataca atgtgaaatg tacaataaat 1980
catatttatg gcaaaaaaaa aaaaaatt 2008

<210> 16
<211> 371
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (360)
<223> n equals a,t,g, or c

<400> 16
agagagctag agggactagg agataatgtg tatgtaggtt tatgtgatgg gatatcaccc 60
tgaagagttg tgtcttttgt ggccagtgac aaatccagga aatgaatgtt gctgataggg 120
ataaatcttg aggctgaggg cgggtggtac agatgtgtat gggaaacccc aaccccctata 180
tattgtaaat agatgggctg ggctaaacat tgttgccgtt tcatacttct accaactcag 240
cttttacaca ataaagctct actgtctctg aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 300
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaattn gggggggggn 360
cccccccccc c 371

<210> 17
<211> 763
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<400> 17
aaaaanaaaa aaaaaaaaaa aaacggaaat aaagtttaaa aaatcaatca acatggcctt 60
taattttaac aattttaaca gcaagtggtg gggggagttc tcagatgagc aactggagct 120
ggaagcactt ctgtggtcaa gcaggcagcc catggggttg catcttcctg ttgggggatc 180
atccattttc ttcaatgaat agttttaagt cttgtcaaat gctcacacag aggcccgcta 240
ttaaggaggc agacaggcaa cattcaatac gaaggcagga caagctcagc cccgctcctt 300
cattcgggca tgtgtcatta gggatgacat tctctgaagg ctgcccggct tgaatggcca 360
aatccctgca tcatggcttt ctttaattcc ctctgctccc aactcacaaa atgaggacct 420
ctcttttaag acgaraaagg cactgttcct caaaggtata catttggaac ttcaataatg 480
aaagcatctc ttgcttggca ggtggaatat aggcaatttt ggatttttaa tgcatggcat 540
ggggcgggag tgaaatatct tgccagggct tgtttgccct ataatgggag agaaccaggc 600

ctctggatga tacggtatca aacactgctg ctcctttctg ttttcttttg tgggaaaggg 660
aggaggatag aatggagagg aattagtggg agcctggggg aagttcaaaa taaagaaact 720
gtgaaatcct ccacctcaaa gttgggtctg caccaggatt ctg 763

<210> 18
<211> 1926
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (898)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1024)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1083)
<223> n equals a,t,g, or c

<400> 18
aataacttga ctggaattct agaaaccgct gtcagagcca ccaacgcaca gtttgacagt 60
cctgagatcc tgcgaaggct ggacgtgcgg ctgctggagg tctctccagg tgacactgga 120
tgggatgtct tcagcctcga ttatcatgtt gacggaccaa ttgcaactgt gtttactcga 180
gaatgtatga gccactacct aagagtattt aacttcctct ggagggcgac ggatggaata 240
catcctcact gacatacgga agggacacat gtgcaatgca aagctcctga gaaacatgcc 300
agagttctcc ggggtgctgc accagtgtca cattttggcc tctgagatgg tccatttcat 360
tcatcagatg cagtattaca tcacatttga ggtgcttgaa tgttcttggg atgagctttg 420
gaacaaagtc cagcaggccc aggatttgga tcacatcatt gctgcacacg aggtgttctt 480
agacaccatc atctcccgct gcctgctgga cagtgactcc agggcacttt taaatcaact 540
tagagctgtg tttgatcaaa ttattgaact tcagaatgct caagatgcaa tatacagagc 600
tgctctggaa gaattgcaga gacgattaca gtttgaagag aaaaagaaac agcgtgaaat 660
tgagggccag tggggagtga cggcagcaga ggaagaggag gaaaataaga ggattggaga 720
atttaaagaa tctataccaa aaatgtgctc acagttgcga atattgaccc atttctacca 780
gggtatcgtg cagcagtttt tggtgttact gacgaccagc tctgacgaga gtcttcggtt 840
tcttagcttc aggctggact tcaacgagca ttacaaagcc agggagccca ggctccgntg 900
tgtctctggg taccaggggg cggcgcattc ccacacgtga arctcgcggt cctcccargg 960
agctgcgggt gatgttcgtt gcactgctag acacgaaatt cccattgacg tcctgcagga 1020
actnatkrct gcaggtgtcc tgcccttccg cccacgagtg cgccatgttt cagcggaggc 1080
cgntgtggga gaagccacgt cgtgtttcam atgtcggagt cgaatgcatt tktaaatccc 1140
taagtcaagt aggctggctg cactgttcac atttgtctct aaaagtcttc atcgctaaaa 1200
gataccataa tttgctgagg cttcttaagc tttctatgtt ataatttata tttgtcactt 1260
taaaaaatcc atttctttta gaaaaaatta gggtgatagg atattcatta gttaagatgg 1320
taacgtcatt gctatttttt taacatcctc tttagaggta atttttgtta acataaccaa 1380
aaattaaatt gaaacaaaat gtcccaacta agaaaatata tagagcattt tatttttttt 1440
tagtgttgta aaatattaac ctctgtgaga tcctttgtat cttaatgcat tacctttaca 1500
catatttatt cttattttct ctcctttcag agtttacatt tttatattta atttactatt 1560

tcagattttt aaaatagtat agaaaaaagt aggagtgata gagaacaaaa atactcttat 1620
acagtgcaac ccaaataccg cgaatgcatc agctaaagca gcgtgtaaat aggagtgacg 1680
agaaagttaa tggagtattt tattttcaaa gttcctgata agcattggaa agaaatcgac 1740
atggataatg aagatttcct ttttccttgc ctatttttc attgtaaata tttatatact 1800
actgmccaag atgttggggt gggggggatt gtttttgta aaaatgtcat tatcaggtca 1860
cataaatctg cctttatgtt gcataagtga aaatttagaa aattaaaagc aattatcttt 1920
magaaa 1926

<210> 19
<211> 2301
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (190)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2052)
<223> n equals a,t,g, or c

<400> 19
tcttatcaca tctaagcctt accaggtaga gaaggtacta aatacacttt agaagtaaaa 60
atatgaagta ccgagaggct aaacccactg gcctaagatc tcaccaaagt tcatgaaaac 120
caggactagg acccacggct cccaaagccc gttcttgctg tgttgtgctg cctccatatc 180
cgtcagaagn agcctttcca gaatgattct gggcatatac taagaagagc aggtatggaa 240
agatctattg tcagggaatc ttagaattcc ctacacgagt gggagaaaga tgtccaaatt 300
ccttacgcat ggtattcatg atggtgccct atctaagtcc aggactgttt tcctacagcg 360
tgcctcaaaa gtgttgtaga gggcaggatt ctacattcac agcctgttcc atctacgaga 420
ttttccagat gctacttgtg gtagacattc ctaactcatg gtacttagcc accagagatc 480
atgatggaat gagtgggtgg cttttctacc tgccattccc tcagaattca tgargggtgg 540
gggacagggg gaccggaatt gtcttagcac cccaatgtta tgacaaaact atgctacttt 600
agaaacgcag tctgtttttc accaattgac atactactga tctgaagtaa ccagtgccat 660
cataagaaat tactgcatta agaaaatcct tgctgtgccc tttgaaaagc tgttcagaaa 720
tcatttacag tgatctttca tctcggtcgc tgtagtgaac attttagtgt gataaatttc 780
aaaattctaa acaaattacc cacttttata ttggaaatct ctaccagaac tccctcttca 840
tttttwaagg catacatttg cttgttttca agatcaagaa ttctgagcta gctttaagta 900
gcaaactgat ttatatgtgc aattatagga tgcattaaga tgaatgatag cctttacata 960
ttgaaaactt tgcagacgtt ttgttttgaa aatggcattg tatagtaaat gcaaattaat 1020
tttgtaaaat tatgttaaag agtatgttca gacactttct gccatggcca aaaagtatgt 1080
atgaaagtat gtgtgtattt gtttgtaaaa ggatgccaat gttttacctg atatcttagt 1140
gacacttcag ttatctatgc attctttaga tctgtgattc ggtaaacagg cagccatgtt 1200
cacgatgcct tctatgtctt accatatttt taattaacct gttaaataca gcttaaaata 1260
tttttatttt atttattcta tttttactga aatatactgc attattgtgt taatgtatta 1320
tctttcctgg atattatctc ccagtgtatc cagatctaag taatctcagt gaactataca 1380
ttgcctaaaa agtggttttg taatgatttg tagtcacatt tctattggga tatgtagaag 1440
aaaaggcaaa atgcttaaag ttccttttat tttttaaaag cagctagata gacacagact 1500
tgccacctca tacatctgct ccttggcaac atcaagggga acgactagcc aacatgccta 1560
tggctaaaaa ctttcctttg cagactaaag cactgcttgg tgcttcgttt ttctaccctt 1620

```
cacaacatgt gtgatttcat ctaagagata tatacatgta cacatgccct ttgtttccac 1680
ctggatacaa gatcactcat agctaattag gaccattgtt ttttgttcat ctgtcttgtt 1740
gcatgaaggg acattagacc catttccatt aaaataagtt cttggtgata aactgtggca 1800
ctgctacttc tttttaaatc cactttatga tttcaagatg gacacttgta agatgactcg 1860
acacaaggcc attgcctgga agccccagag ctttcctctg tttgtatggc ccgttcatgt 1920
cccaggcatt gcaacacaaa ctcaagattt caccacaaca tgacaagcat tttcctaact 1980
gatattagca caatttaact aataagcccc ttcgctctct agttggccag gcttaaccta 2040
atacacatct anactgtgtg ccacacggcc agtagaaagt ttaacttcag cttcagggca 2100
aagataccca ctcacaccgt gtcaacgcaa gcagtagttc ctggcctcca gagcagctta 2160
cttcccctga aagaacgctt tgttttcctt tatgcccttt tcctgttgac cacttttaca 2220
catttaaatg taatttgttg tgagaataaa tttagctgca taaaaaaaaa aaaaaaaagg 2280
gcggccgctc gcgatctaga a                                          2301
```

<210> 20
<211> 538
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (507)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (514)
<223> n equals a,t,g, or c

<400> 20

```
agaggccgcc aacatgatcc tggtggatga tgacttctca gccatcatga atgcagtgga 60
ggaaggcaag ggtatttttt acaacatcaa aaactttgtc cgattccagc tgagcacgag 120
catctccgcc ctgagtctca tcactctgtc caccgtgttc aacctgccca gccccctcaa 180
cgccatgcag atcctatgga tcaacatcat catggatggg ccaccgggca gaggtgaggc 240
agggcggctg ggagccctgt gtctctttac ctacctgcgg ggcttcctcc aggggctgct 300
ggctgtgccc aaggctatag ggatgaacaa atacagccac tttccatcag gagttcccag 360
aaaactgaag tgtgttgcac tggagtgaga ctgggagtag aaggcagagg agaaagtacc 420
tgggccggca gagctgggtg aggatggaac tttctgcttc ctctggctgg atgctctctc 480
tgggcaaacc tgcatgggtt aattctnatg cttnaatttc aagtcaccca gtcactgg   538
```

<210> 21
<211> 1403
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1370)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (1386)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1393)
<223> n equals a,t,g, or c

<400> 21
ggcacgagtg gccacatttc cagtacccag tagtcatctg tgccaggggg ttatccaggt 60
acagaacatt cccatcgttg cagaaggttc tatcagctag cactgggttg gacgacactt 120
gccaagacga gctggctaga ggatrgttct ccggacctgg tcccacgtgg ttcccagctg 180
gctggaggcg tgatcctggg tgtggccctg tggctccgcc atgacccgca gaccaccaac 240
ctcctgtatc tggagctggg agacaagccc gcgcccaaca ccttctatgt aggcatctac 300
atcctcatcg ctgtgggcgc tgtcatgatg ttcgttggct tcctgggctg ctacggggcc 360
atccaggaat cccagtgcct gctggggacg ttcttcacct gcctggtcat cctgtttgcc 420
tgtgaggtgg ccgccggcat ctggggcttt gtcaacaagg accagatcgc caaggatgtg 480
aagcagttct atgaccaggc cctacagcag gccgtggtgg atgatgacgc caacaacgcc 540
aaggctgtgg tgaagacctt ccacgagacg cttgactgct gtggctccag cacactgact 600
gctttgacca cctcagtgct caagaacaat ttgtgtccct cgggcagcaa catcatcagc 660
aacctcttca aggaggactg ccaccagaag atcgatgacc tcttctccgg gaagctgtac 720
ctcatcggca ttgctgccat cgtggtcgct gtgatcatga tcttcgagat gatcctgagc 780
atggtgctgt gctgtggcat ccggaacagc tccgtgtact gaggccccgc agctctggcc 840
acagggacct ctgcagtgcc ccctaagtga cccggacact tccgaggggg ccatcaccgc 900
ctgtgtatat aacgtttccg gtattactct gctacacgta gcctttttac ttttggggtt 960
ttgtttttgt tctgaacttt cctgttacct tttcagggct gacgtcacat gtaggtggcg 1020
tgtatgagtg gagacgggcc tgggtcttgg ggactggagg gcaggggtcc ttctgccctg 1080
gggtcccagg gtgctctgcc tgctcagcca ggcctctcct gggagccact cgcccagaga 1140
ctcagcttgg ccaacttggg ggctgtgtc cacccagccc gcccgtcctg tgggctgcac 1200
agctcacctt gttccctcct gccccggttc gagagccgag tctgtgggca ctctctgcct 1260
tcatgcacct gtcctttcta acacgtcgcc ttcaactgta atcacaacat cctactccgt 1320
catttaataa agaaggaaca tcaggcatgc taaaaaaaaa aaaaaaaaan ksgggggggg 1380
gcccgntacc canttggccc aat 1403

<210> 22
<211> 478
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (474)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (475)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (476)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (478)
<223> n equals a,t,g, or c

<400> 22
gagcagaaag tagatgctta atggcagtgt tctctgaccc agacatgaat cagaatcacc 60
tggaagggct tgttaataca aattgctagg ccacaaccct aaagtttctg attcagggta 120
gggcaaggcg aggcttaaac ttcaggccag gggccacttt aagaattgct atatggccag 180
ggccgggcgc ggtggctcac gcctgtaatc ccagcacttt gggaggccga ggtgggcgga 240
tcacaaggtc aggagatcga gaccatcctg gctaacacgg tgaaaccctg tctgtagtaa 300
aaatacaaaa aaattagcca ggcatggtgg tgggtgcctg tagtcccagc tacttgggag 360
gctgaggcag gagaatggtg tgaacccagg aggtggagct tgcagtgagc cgagatcgtg 420
ccactgcact ccagcctggg caacagagcg agacttccgt ctcaaaaaaa aaannncn 478

<210> 23
<211> 1252
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1227)
<223> n equals a,t,g, or c

<400> 23
tttcgagctc tgcaccgagg agctgccctg gacttgagtc ccttgcatcg gagtccccat 60
ccctcccgcc aagccatatt ctgttggatg agcttcagtg cctaccagac agcctttatc 120
tgccttgggc tcctggtgca gcagatcatc ttcttcctgg gaaccacggc cctggccttc 180
ctggtgctca tgcctgtgct ccatggcagg aacctcctgc tcttccgttc cctggagtcc 240
tcgtggccct tctggctgac tttggccctg gctgtgatcc tgcagaacat ggcagcccat 300
tgggtcttcc tggagactca tgatggacac ccacagctga ccaaccggcg agtgctctat 360
gcagccacct ttcttctctt ccccctcaat gtgctggtgg gtgccatggt ggccacctgg 420
cgagtgctcc tctctgccct ctacaacgcc atccaccttg gccagatgga cctcagcctg 480
ctgccaccga gagccgcact ctcgaccccg gctactacac gtaccgaaac ttcttgaaga 540
ttgaagtcag ccagtcgcat ccagccatga cagccttctg ctccctgctc ctgcaagcgc 600
agagcctcct acccaggacc atggcagccc cccaggacag cctcagacca ggggaggaag 660
acgaagggat gcagctgcta cagacaaagg rctccatggc caagggagct aggcccgggg 720
ccagccgcgg cagggctcgc tggggtctgg cctacacgct gctgcacaac ccaaccctgc 780
aggtcttccg caagacggcc ctgttgggtg ccaatggtgc ccagccctga gggcagggaa 840
ggtcaaccca cctgcccatc tgtgctgagg catgttcctg cctaccatcc tcctccctcc 900
ccggctctcc tcccagcatc acaccagcca tgcagccagc aggtcctccg gatcacygtg 960
gttkggtgga ggtctgtctg cactgggagc ctcargargg ctctgctcca cccacttggc 1020
tatgggagag ccagcagggg ttctggagaa aaaaactggt gggttagggc cttggtccag 1080
gagccagttg agccagggca gccacatcca ggcgtctccc taccctggct ctgccatcag 1140
ccttgaaagg gcctcgaata aaccttctct tggaaccact ccaagcccag ctccactcag 1200
ccttggcctt cacgcttgtg gaaacancca aggcattcct ccacccctca ag 1252

<210> 24
<211> 1074
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (928)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (934)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1028)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1031)
<223> n equals a,t,g, or c

<400> 24
gctggccttt gctctgcgga ctggcggccc cctggcacag aggtgacatc tcaagggccc 60
aggcagccct cttctagtgg tgccaagagg cggaggctgc gggctgccct tggtccccag 120
cccactcgct cagccctgag gtttccctct gcttccccag ggagcttgaa ggccaagcag 180
tccatggcgg gaatccstgg tagggagagt aatgccccat ctgtgcccac tgtctccctg 240
ctgccggggg cgcctggagg caatgccagc tccaggacag aggctcaggt gcccaacggg 300
caaggcagcc caggggggctg tgtctgttca agtcaggctt ccccggcccc tcgcgcagca 360
gcgcctccac gggcagcccg gggccccacc ccacgcactg aagaggccgc ctgggctgcc 420
atggccctga ccttcctgct ggtgctgctc accctggcca cgctctgcac acggytgcac 480
agaaacttcc gacgcgggga gagcatytac tgggggccca cagcggacag ccaggacaca 540
gtggctgctg tgctgaagcg gaggctgctg cagccctcgc gccgggtcaa gcgctcgcgc 600
cggagacccc tcctcccgcc cacgccggac agcggcccgg aaggcgagag ctcggagtga 660
cggcctggga cctgccactg tggcgtgcgg ctcctccccg cgccgcgagg ccgcgacctc 720
tgccacgtgg accgcgcgcg gggcgctccc tggtggcgat ggcgcggcac tggccgagca 780
ctgcgggggc tttcctcctt gttggttgct gagtgggcgg ccaaggggag aaaaggagcc 840
gcttctgcct cccttgccaa aactccgttt ctaattaaat tatttttagt agaaaaaaaa 900
aaaaaaaaaa aaaaaggcgg ccgtttanag gatncctcga aggggcccaa gttaacgcgt 960
gcatgcgaag tcataactct ctccctataa tgatcgtatt ataagtaagc actggccgtc 1020
gtttttanaa ngtcgtgaat ggggaaattt gctaactttg ggaacttttt gaaa 1074

<210> 25
<211> 1186
<212> DNA
<213> Homo sapiens

<400> 25

tatcagctca agccttacac cayccacctc atcaaggacc tccacttttt ccttcgagtg 60
ctcatccaac tgtaccaccg tatccctcac aagctacaca tcataccact ttgggaccgg 120
gaccccagca ccagccttct ggaacagggc cacattgtcc attacctgtc acaggtcctc 180
atctccagcc ccaaggacca aacagtattc caacacctac tgcttcaggg ttctgtcctc 240
atcctggctc tgtggccctg ccacatgggg ttcaaggacc tcagcaggca tctccagtgc 300
ctggacagat tccaattcac agagcacagg tgccaccaac atttcaaaac aattaccatg 360
ggtcagggtg gcattaaaat ggactccaaa aacatttttt taaatgttct gtaagataaa 420
ctgtatattt catatgtacc tgttaaggta ctttttaaag cttgtacatg aacctttgta 480
taaaaaacac cagtgctctt tcgttgtatt tttctcattt ttgcttttta aaattccttt 540
aaaaaatgtg ctgttaagcc agtattaggt atctttattt tgtaagtgaa cattccagct 600
gtttttttct ggcagatctg atgctgattt gatgctgtat gatctttttt ttttttttag 660
ttaaattcat ttagtgaatg ttctattatt ttatacatac acattaagta ctcagctaag 720
taatggcact atgaggattt ttttttcttt tcctgtcagc agcagttctg tgaatgcatc 780
ttaggtataa aaatgcaata cagattttta tattttggtg tggacatggc tcattttgtt 840
ttaccagtta tttgcaagca aaatgtaatt taatgtatag atgatttcta atgtctcctg 900
acaaactgta aatactgcat ttcttttgcg tatataattg cttacagctt ttctcatttg 960
atatatagca ttgtacatat gacaagtctt ttgcaaaact gtgtgatctt tgtgaaagta 1020
gtacagtata tgacctttaa tttctttttt attttaaata tactgtcaca ctgaagcact 1080
ggttgggcat tttaattcat gttaataaat cacaattatg tcagttccca cgcgtccgcg 1140
gacgcgtggg cggacgcgtg ggcggacgcg tgggcggacg cgtggg 1186

<210> 26
<211> 888
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (670)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (675)
<223> n equals a,t,g, or c

<400> 26
gcccccaccc gctgtgactg cattctggga tccccagcct gggaatccaa gagctgtcgg 60
cccattttat tcctccctcc cagacctgac cccttcatcg ggctcaaga gacctctctc 120
tccaaatctc catttgcctc ctctggctaa gctggaaaat gcacactctg ccctgggtgt 180
ttccatatta tccgcctgcc cttcctcctg ggtgcctccc gtagccttag taaggctct 240
gctttcctgg gcccctagag ctgagccatg ctttgccata aaggtgctcc cggcttgcaa 300
ccaatgtgtc tgcttgtgca tctgtctgtg ggtgtggtgg ggagggaggg gaccaggtgg 360
gtactggcac tctggggtcc ggactttatg tccatggagg ccccaattga ctcagttcaa 420
gggtcactga ggctttgctg atgtagggag agggccagag ggaggctcca ccccagccgg 480
gctgagccag ggaacctggg acaaaggtca ggtggctgat tccaggtagt gttttggagc 540
tgggcagtca gtggctgggc ggggacatat gcccaagagc caccatgaac tcccaggggc 600
ctccaggcag gggccctcca tcccgcacca agtctttcaa catgatgtcc ccgacgggcg 660
acaactcggn ctacnggctg agattaaggc aggcaagagc ctgaagccga cgccccagag 720
caaggggctg accacagtgt tttcaggcat cgggcagccg gccttccagg taggcgggcc 780
cagcaggagc ctgcgacccg gcttccctgg ccctaggcca ccgggcgctc agccccaccg 840

cttctccctg cagcccgatt cgccgctgcc ttctgtgtca cctgcact 888

<210> 27
<211> 789
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (420)
<223> n equals a,t,g, or c

<400> 27
gggtcgaccc acgcgtccgg ttggtcttgt gtctataaga atgatcaagc tgcaaaggat 60
aatccaacta aaagtcttca ggaagaagaa ccatgtccaa ggtttgccca tcagcttgta 120
tacgatgagc tacacaaggt tcattactta tttggtggga atccaggaaa atcttgctct 180
ccaaagatga gattagatga cttctggtca ctgaagttgt gtagaccttc aaaagattat 240
ttactgaggc attgcaagta cctcataaga aaacacakgt ttgaagaaaa ggcccaagtg 300
gatcccctta gtgctctgaa atatttacaa aatgatcttt atataactgt ggatcattca 360
gacccagaag agacaaaaga gtttcagctc ctggcatcag ctctattcaa atctggttcn 420
agattttaca gctctgggct tttctgatgt ggatcacacc tatgctcaaa gaactcagct 480
ctttgacacc ttagtaaatt tctttcctga cagcatgact cctcctaaag gcaacctggt 540
agacctcatc acactgtaac tgaagagtca ctggacacag aaatggaaaa caggagtcga 600
ttttccgtcy tttggattgc agctccactg actgacagta aagctgcagt gattgaggac 660
tgcaccagag ttctgaaggg atcttaacca tcacaagttt ttaccctctt ccttcatgcc 720
tgacctcaac cccgctctcc tcatcctatt cctaaattag gctaataaag tgaaattggt 780
atactttcc 789

<210> 28
<211> 847
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (799)
<223> n equals a,t,g, or c

<400> 28
ctgtcctgag ctgttcactg cttggtggct accttctaag agtgagcatc tcacaagcag 60
gtgtcttaag tgaggaaatg gaagctgcag cttcttaaac ctgggaatta gtagagcatt 120
acccctgctg tattctatta gaggtcaagc catcactgaa gccatattca aggagaggga 180
tcgtgcacac tcttccggaa atacgaccac atgagggctg ccatcctgga aaaaatgcct 240
cttgtggagc gagatggccc tcaggctgat gaggaagcaa aggaaagcaa agaagcagcc 300
cagctttcag aagcagcccc agtgcccaca gagccccagg cctcacagct cctggatctg 360
ctagatctcc tggatggggc ttctggggat gtccagcatc ctccccatct ggacccctcc 420
ccaggaggtg ccctggtaca cctgcttgac cttccctgtg twcctccacc cccagctccc 480
atcccagatc tcaaagtgtt tgagcgtgar ggagtacagc tgaatctgtc tttcattcga 540
ccccctgaaa accctgcttt gctgttaatc accatcactg ccaccaactt ctcagagggt 600
gatgtcaccc atttcatctg ccaggctgct gtgcccaaga gtctccagct gcagctgcag 660
gcccccagtg ggaacacagt tccagctcgg ggtggccttc ctatcaccca gctcttcaga 720

atcctcaatc ctaacaaggc ccccctgcgg ctaaagctgc gctcactacg accactttca 780
ccagtcggtg caggagatnt ttgaggtgaa caactgcctg tggaatcgtg gcagtaatgt 840
ctccaat 847

<210> 29
<211> 666
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<400> 29
gganccatgg gagtatgcac atgggatcat aatccattct gtggtttgga aaaagaaaat 60
gttaacctct gctttagagg gtagctacta gctttgttgg ggataaaagt gtaatacatg 120
cacttttgaa ctctgaaagt ttgccaatct gaaaaggggt gtttctgaag accactatct 180
tttacgaaca cttaaaaata agtgtttgca gttgtgtatg ggcacgatac tgtattcttt 240
acatttttat ggccctacag ctacttctta tccctgcaag tatataaatt aaaaccaagt 300
cactttagaa cagctttgaa actagagttt caaaggtaaa aggatctcat gtttctgaat 360
ctgcgtaaag caagatggct gtgatttgac aggtttaatt gctagktttt ataggtggat 420
agaaatgaat agtttggagt ctttaaaatg ttttaaaaaa tgtttgctta ctatctatat 480
atatgacatt attcccaatt agttttatat ctccaagata tatatatgta tataggtata 540
tacacatatg tatatataca tagtctatat attctatata agaatatatt ccaataagaa 600
tatattccat acgggaatat attagtcatt gatgtatttt gccggtaaaa ttaaaagata 660
ttttaa 666

<210> 30
<211> 517
<212> DNA
<213> Homo sapiens

<400> 30
cgctcggctt cctgggtctg gctgctgccg cccgccggtg tccgcccgtg tcgcgccggg 60
gcaccaagga gccgttggag ggtccgggcg gaggcccgct cgtgtggaag tcgtcgacgc 120
cgccgctcgt ccgtcctccc gtccgttctc gctcccggcc gccatcatgc tggcgctcat 180
ctcccgcctg ctggactggt tccgttcgct cttctggaag gaagagatgg agctgacgct 240
cgtggggctg cagtactcgg gcaagaccac cttcgtcaat gtcatcgcgt caggtcaatt 300
cagtgaagat atgataccca cagtgggctt caacatgagg aaggtaacta aaggtaacgt 360
cacaataaag atctgggaca taggaggaca accccgattt cgaagcatgt gggagcggta 420
ttgcagagga gtcaatgcta ttgtttacat gatagatgct gcagatcgtg aaaagataga 480
agcttcccga aatgagctaa cataatcttc tagataa 517

<210> 31
<211> 2675
<212> DNA
<213> Homo sapiens

<400> 31
gcgaggtcac gtgacggagc gccggagcgg agggagccgg ggctgggagt tctcctgagg 60

```
gaagaggagt ggagtagggg ggacgcggcg gcggcgttga caatgagttt tcttggaggc 120
tttttggtc caatttgtga gatcgatatt gttcttaatg atggggaaac caggaaaatg 180
gcagaaatga aaactgaaga tggcaaagta gaaaaacact atctcttcta tgacggagaa 240
tccgtttcag gaaaggtaaa cctagccttt aagcaacctg gaaagaggct agaacaccaa 300
ggaattagaa ttgaatttgt aggtcaaatt gaacttttca atgacaagag taatactcat 360
gaatttgtaa acctagtgaa agaactagcc ttacctggag aactgactca gagcagaagt 420
tatgattttg aatttatgca agttgaaaag ccatatgaat cttacatcgg tgccaatgtc 480
cgcttgaggt attttcttaa agtgacaata gtgagaagac tgacagattt ggtaaaagag 540
tatgatctta ttgttcacca gcttgccacc tatcctgatg ttaacaactc tattaagatg 600
gaagtgggca ttgaagattg tctacatata gaatttgaat ataataaatc aaagtatcat 660
ttaaaggatg tgattgttgg aaaaatttac ttcttattag taagaataaa aatacaacat 720
atggagttac agctgatcaa aaaagagatc acaggaattg gacccagtac cacaacagaa 780
acagaaacaa tcgccaaata tgaaataatg gatggtgcac cagtaaaagg tgaatcaatt 840
ccaataaggc tatttttagc aggatatgac ccaactccaa caatgagaga tgtgaacaaa 900
aaattttcag taaggtactt tttgaattta gtgcttgttg atgaggaaga ccggagtagc 960
ttcaaacagc aggagataat tttatggaga aaagctcctg aaaaactgag gaaacagaga 1020
acaaactttc accagcgatt tgaatctcca gaatcacagg catctgccga acagcctgaa 1080
atgtgaactg aacaggagaa aaaaagaaaa gcmaaaaact cctgtwaccc ttgarattaa 1140
gttcagcagg ttaaagatgg ttgcagctgg agggggcgga aaaaggccaa aactccatat 1200
atgttagtct tcctttatct tacagcgcay wtttatttta tgatataatg aaatgttcgt 1260
tcatgtatat acatttttaa aagtgctttc tttgaaacac tggaactttg ttaagctgcc 1320
ttttttttt taacttccta ctttgatgat aagcactcag atatatatca gcgtaaacat 1380
gaaaaatttt catgtgagta ggctggtatt tgtaattttg ctttctttct gcataatgtt 1440
gattataaat cctctctttt caggctaatg attacctctt attctctaca tgcaaaaaat 1500
taaatatttt gtgttcaaat aaaattagaa aacytgagtg gcctcttgtg tcctgcagag 1560
atttaaaaca tggcatctca atatttttga gaactacatt tgtttttaac atatgtgttt 1620
gagaaaagca tatggagtgt ttcaccgcag gcacttctga gtaccattcc atggcttcca 1680
gaattttatc ctctttgagg tcttctgtgc tatgaatatt agatttcttt ccccaaggga 1740
ttatgtggca ggtcattatg gccttctttt ttttggccat attaagtaac agttttgcta 1800
tattccagta gtaccgttgt gtgttttctg caatgtggag ttgacttagc ttggcatttt 1860
agatttgtta aaactatttt ttccataaat actttgaaac gtatttatat atttcaattt 1920
aaggaatctt tttgccatgt gtatgcaaat attattttct tcatacattc attttctttt 1980
caggggaaaa ttttgggatg ggggactcag gaggacctgt gaagcatgta gttatctaga 2040
tctgggtaat ttcatgttta ttaaactcga actttggcta gttaaactca tattgaaact 2100
tcatctagtc tcttaatttt ttaacactaa attcaagtca tttgttttaa gtctctaaaa 2160
aagaagattg cagtcatcca ttcatatgca tggggtctga tcgcaaatac actaaatgtg 2220
gagtgtagga accaaaatga aacctgctgt atggaaacta ctttcactta tggttcattg 2280
gtttttgtac caatattttt tatgcacttc agtgcaagtc ttgtcagtta accttacttt 2340
atgagtaagc taaataaccc aaattacatt tctttaaacc tgttttacta ctatggcact 2400
ttgataaaat ggtcaggaac caactttact ggcaaaaggg tccatgtacc accatgtgct 2460
ggagcatctg ttctacatgt ggatatcwat gaatggtaat gttttccttc atgtaagtgc 2520
ctattcagag tttcagaatt ttaaaatgcc aaatattttc atggtcattt gcatgtagta 2580
agccagaaaa tattcaaaga gattttgaaa accaattgta tttaaccagc ctcaaattgt 2640
gcaaccatga tgtataataa agaatttgaa acaga                             2675
```

<210> 32
<211> 277
<212> DNA
<213> Homo sapiens

<220>

<221> misc feature
<222> (109)
<223> n equals a,t,g, or c

<400> 32
agccgcaccc ccagcacttc ggacatggcc gaggaaggca gagtggccag cgggggcccc 60
ccagggctgg agacctcgga gtctctcagt gactcactct acgactcgnt gtcctcttgt 120
gggagtcagg gctgaggggc tgcgccacgc cacggccccg ctggagctgg ggaccacaga 180
ctggaccggc tctcttcatg cccagccccc ggagacgggg acccccttccc tgaagggacc 240
aaggaggcag gtggataaga aggttgaaaa gggggtt 277

<210> 33
<211> 921
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (839)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (846)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (886)
<223> n equals a,t,g, or c

<400> 33
cngtggcttt cctgcaccac tgccccccac caggatgatg gagagtaaga tgattgctgc 60
catacactcc agcagtgcag atgccaccag cagttcaaat tatcattcct ttgtcactgc 120
ttcatccacc tctgtggacg atgcattgcc tttaccactt cctgtcccac aacctaagca 180
tgcttctcag aaaacagttt actcctcctt tgctaggccc gatgtcacca ctgaaccctt 240
tggtccagat aactgtttgc atttcaatat gactccaaac tgccagtacc gtccccagag 300
tgtacctccc catcacaata aattggagca gcaccaagtg tatggtgcca ggtcagagcc 360
accagcctcc atgggtcttc gttataacac atatgtggcc ccaggaagaa acgcatctgg 420
acaccactcc aagccatgca gccgggtcga gtatgtgtct tctttgagct cctctgtcag 480
gaatacctgt taccccgaag acattccacc gtaccctacc atccggagag tgcagtctct 540
ccatgctccg ccgtcttcca tgattcgctc tgttcccatt tcacggacag aagttccccc 600
agatgatgag ccagcctact gcccaagacc tctgtaccaa tataagccat atcagtcctc 660
ccaggcccgc tcagattatc atgtcactca gcttcagcct tactttgaga atggccgggt 720
ccactacagg tatagcccat attccagttc ttctagttcc tattacagtc cagatggggc 780
cctgtgtgat gtggatgcct atggacartc cagttgagac cctttcaacg gctttccant 840

cgagantttg ttttttacaa tcctaggttg caaggaaaga gctttntaca gttatgctgg 900
gtttgggtcc aggtccccgg g 921

<210> 34
<211> 1467
<212> DNA
<213> Homo sapiens

<400> 34
aaaaaaaaaa gaaaagttct gtgttgatgt acagtttctc ctaagaagaa gcgaggtggt 60
tgaattttgg aagcacttct tgaatcggat taacccatgc tcttattgaa ttttttcatc 120
tgctctgttt agtttgatat taaagcaaaa ttaagaggtc ttagtttttc ctatagaact 180
tttaatatgt caaaagctat attgtctaaa tttcagtact taagcaaata ctgagtagtg 240
ttttaaattc agaaatagag cttctattat gaacacatga gaatgatttt tttctcttaa 300
tcattattaa ggaaatattt taatttcatg gtcatataat ggtgataagt aatacctgat 360
tgtttccttt tctgttctag taactcagag gagatacgtg ttttatttgt gatagcaaat 420
tcctaaatga acattaggca agtggtatca ttatcaggcc agctgcagcc tcttgccttg 480
acctgcattc ctagaatttc tttgttgctg taattcttga ttaagtgacc ttgactttca 540
ttttgtaatt ttgctaatca tcagcaaatt cacttgcatg acgttactgc caaatatgaa 600
ggcagttgaa ttattatgag tgattgtggc agaggtttgt gccatggtga aaactttgat 660
gtttgtctgt gttcattgga tccatctttt taaatgacat taccatgagt ctgttgtcaa 720
acctaaatat ctttgtttga atttaaaatg ggactctata ttgttgtagt tcaggtcttc 780
attgactaag agattgagag aaatctgaca taagaaaata ttgttttcac tgcaggaata 840
aagaggaagt aacagtgaat ccaatatagt tcatattgtt attgtccaat catcaagtta 900
actaagcatt atcagattac gtttatttct catacatatg gatattaact taaggtaaaa 960
aagctggatg tgaaggatct gaaaaggcat taatttatgt actaattcta taaacatgta 1020
ttaataattg cagtattatt aaatacagat ggactcaatg tacctttgaa aagaccacta 1080
atttagaaaa caaagctaag tgcagtcatt acaagaagca aagaaatact taagttagaa 1140
aaaaattaaa atgaagggat ggtctaagtt ttcttcatgc tggaacaaat gttaaagaag 1200
cagtgattgc ttacaatgta tgtgataaaa taataccttt cacaatcaaa attttaatag 1260
taaatataag ataaaattta tattaaataa tgaaaacgta tttgtactga atttagtcac 1320
tagagaacat cgtaacaaaa tacatgaaac aaaagtagcc agaaatgtta gaacaggtgg 1380
aaatgtatac attatttgat ggtttgtttt tttatggaaa taaacaacat acatagaatt 1440
aaatggtgat caaaaacatg gaaaaaa 1467

<210> 35
<211> 2077
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (15)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (423)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (730)
<223> n equals a,t,g, or c

<400> 35
cggacggtgg gncgncgaca caatgggcca yggagttccc gttcgatgtg gacgcgctgt 60
tcccggagcg gatcacggtg ctggaccagc acctggaggc ccccagcccg ccgacccgga 120
accacaacgc cggcccgtgt tgatctacag cagcaaatta tgaccattat agatgaactg 180
ggcaaggctt ctgccaaggc ccagaatctt tccgctccta tcactagtgc atcaaggatg 240
cagagtaacc gccatgttgt ttatattctc aaagacagtt cagcccgacc ggctggaaaa 300
ggagccatta ttggtttcat caaagttgga tacaagaagc tctttgtact ggatgatcgt 360
gaggctcata atgaggtaga accactttgc atcctggact tttacatcca tgagtctgtg 420
cangccatgg ccatgggcga gaactcttcc agtatatgtt gcagaaggag cgagtggaac 480
cgcaccaact ggcaattgac cgaccctcac agaagctgct gaaattcctg aataagcact 540
acaatctgga gaccacagtc ccacaggtga acaactttgt gatctttgaa ggcttctttg 600
cccatcaaca tcctccagca aggaagctgc cacccaagag agcagaggga gacatcaagc 660
catactcctc tagtgaccga gaatttctga aggtagctgt ggagcctcct tggcccctaa 720
acagggcccn tcgccgcgcc acacctccag cscacccacc cccccgctcc agcagcctgg 780
gaaactcacc agaacgaggt cccctccgcc cctttgtgcc agagcaggag ctgctgcgtt 840
ccttgcgcct ctgcccccca caccctaccg cccgccttct gttggctgct gaccctgggg 900
gcagcccagc tcaacgtcgt cgcaccagct cccttccccg ctctgaggag agtcgatact 960
aacagctacc ctctccctgc cctgggagac ctggggtggg cagggaaccc ctccctgaga 1020
acctcagacc cactcttcca ttgcatcctg taggacccag tggaacctga cagagcccat 1080
aggattccct cttctacttt cttagacagc agggatgtca gggtctcaaa ctgcctaaca 1140
ctttgtagct tttcttaaca caaaagcacc ccttctctcc taacttgggc tctgaatact 1200
ttcccaacag gaagtctgat ctgttgccag acttcttggt tagatggctc atacatttat 1260
ctagagaagc acactcttgc ttgctgtcaa actttagamc accatggaag gtctaagggc 1320
atcctgtgcc agggaaactt tttaaggaat tttatctatg ggataaaccc catattccct 1380
ctagtgtcta ctggtggctc taatactgct ttgtgctgcc tgccacactt gccctttgag 1440
cctgcgaatg gccgctagtg agcaagctct gcttcagagc agtctagtta ggtagaacag 1500
ggacttacca gcttcccaaa gggatctact caccattgcc aaactcttca tttccacatt 1560
ttgtgtaggt gtcagggaac cccaaactgg tgttgctttg gggtctctaa aggagattgg 1620
ctgacaccac catttccccc agatccagat tctctgaggg aggttgtttc ttgagagtag 1680
atccagagtg tcaaggatct gttagatcct ggaatccctt cttgcatcca tccctccctg 1740
gtagctaggt cccgatatac tcctgtcttg tgagattgtc gagatgagat ggggaccac 1800
tcttcctctg tccttcctct ctcctttcct ccatagcaag gacgaccttc cctgctccat 1860
gcccagagta tagctagatc ccttcccctc cctaccctct gaatgtgtgc tagatcaggt 1920
gccccactgt gtttcctgaa atccttggga gccggatctc cccatctccc ctactcactc 1980
ttccctttc ttctctcagt gttgtctgaa taaagtgtga aatcttttgt gttttctaaa 2040
ttgacatttt caatgaaaaa aagaatcaca aaaaaaa 2077

<210> 36
<211> 384
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (370)
<223> n equals a,t,g, or c

<400> 36
ccagcaggag aatcctcccc tgccccttgg ctcaaaggcc ctggagccca cctcccagaa 60
gcccggtgtg ggggcgggcc acgggggaga tcccaagctc agtccccaca aagttcaggg 120
ccggtcggag gcaggggcag gtccgggtcc aaagcaagga caccacagct cttccgactc 180
cagcagcagc tccagcgatt cggacacgga tgtraagtcc cacgctgctg gctccaagca 240
gcacgagagc atcccgggca aggccaagaa gcccaaagtg aagaagaagg agaagggcaa 300
gaaggagaag ggcaagaaga aggaggctcc ccactgaagg gcctggacaa ggctcattaa 360
acttcntctn tgccaaaaaa aaaa 384

<210> 37
<211> 468
<212> DNA
<213> Homo sapiens

<400> 37
gcgatgctgg gtgtggcagg cctcctgagc cggctggagg aggacaggct gctgctgcta 60
ccgaaggagg atgkctgtcg ctgggccttg gctgtaggca gctgggctta ctgccgggcc 120
ctgcatacac agcgcctcca gtgggagtga cagttggata cagccaggca gggtttctgc 180
cctgccgaac actttccctc ccacctgcct gctcctggcg ccttctccct aggggtagac 240
tcttctgcct actgaagtgg gtttgctgca cattgactgg tcaggggcag agtctgggtg 300
ctgtcctttg gccacgtgtg gggacttgtc tagaccagaa tgaaaggaca gggtcccaga 360
cacgtttggg ggtcctgatt ctgggctgga cacggttgtg gatccagaga agaggcctag 420
tctccaataa atcttaggaa ttttgcagga aaaaaaaaaa aaaaaaa 468

<210> 38
<211> 1095
<212> DNA
<213> Homo sapiens

<400> 38
ggcacgagga taatgagcat aagcgttcac tgaccaagac tccagccaga aagtctgcac 60
atgtgaccgt gtctgggggc acccaaaaag gcgaggctgt gcttgggaca cacaaattaa 120
agaccatcac ggggaattct gctgctgtta ttaccccatt caagttgaca actgaggcaa 180
cgcagactcc agtctccaat aagaaaccag tgtttgatct taaagcaagt ttgtctcgtc 240
ccctcaacta tgaaccacac aaaggaaagc taaaaccatg gggcaatct aaagaaaata 300
attatctaaa tcaacatgtc aacagaatta acttctacaa gaaaacttac aaacaacccc 360
atctccagac aaaggaagag caacggaaga aacgcgagca agaacgaaag gagaagaaag 420
caaaggtttt gggaatgcga aggggcctca ttttggctga agattaataa ttttttaaca 480
tcttgtaaat attcctgtat tctcaacttt tttcctttg taaatttttt ttttttgctg 540
tcatccccac tttagtcacg agatcttttt ctgctaactg ttcatagtct gtgtagtgtc 600
catgggttct tcatgtgcta tgatctctga aaagacgtta tcaccttaaa gctcaaattc 660

tttgggatgg tttttactta agtccattaa caattcaggt ttctaacgag acccatccta 720
aaattctgtt tctagatttt taatgtcaag ttcccaagtt ccccctgctg gttctaatat 780
taacagaact gcagtcttct gctagccaat agcatttacc tgatggcagc tagttatgca 840
agcttcagga gaatttgaac aataacaaga atagggtaag ctgggataga aaggccacct 900
cttcactctc tatagaatat agtaaccttt atgaaacggg gccatatagt ttggttatga 960
catcaatatt ttacctaggt gaaattgttt aggcttatgt accttcgttc aaatatcctc 1020
atgtaattgc catctgtcac tcactatatt cacaaaaata aaactctaca actcatctaa 1080
catgcttact taaaa 1095

<210> 39
<211> 1757
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (596)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (647)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (648)
<223> n equals a,t,g, or c

<400> 39
gccagccacc attttatctc tctaaagtct ggtcccagta ttaaacctat tctttagtaa 60
actcatatta ctgttctaaa ttgaagaaat tatttattac tctgtacttc tagactcaaa 120
attctttatc aaagatagtc tcaaagaggt agtacaagtc ctgtttaact gcactttttc 180
acattcacag tgcttcctct gatatctttc cttacatcat tatacactgt tgatatcatt 240
ttactcttct ttctcttcta catttcttaa attttggttc ttttcctgta catgtgtttt 300
agcggggccc ttttctttga actttgtcta attagcctgt acatttttgt ttcttttaag 360
gtagaacaga tcttttttttg tttctccttt taagtctact ggttttaaaa gaggtaaatg 420
tatccataga ccacagtgcc ttgctttttc ctctgccagc acatggagca cgggattaga 480
tgcacaaacc tatttaggga actattttgg tagatgtttg agtttataca gaaattgcag 540
ctggtatttt attttgctgt acatttactc aacttgtcca ttagtattta actatntcca 600
gagtttgttt aggagtaaga attgacccat tcgttagttt accatanntt ttcctggtat 660
aaaaaggagc cagaaataag ccttattgct aaataattaa ttatgtaagc ccacctaggt 720
cctgcataag atccccctca catacttcac aatatatatg tgtgtgtgtg tgtgtgtgtg 780
tgtgtgtgtg tgtgtgtgtg tgtgtatktg gctaaaaaat tatactgcca aaattactga 840
ttataaatac ttgactacac tgattgatgg gacaaaatga ttaaagtatt ttcagggatc 900
ttattccata tgtcaccacc aaagatttct acagtgttat aaagtatata aatattccaa 960
atttctgtgg ttaaatattt ttttcttttt tttcctttttt tagaataaca cagtctgtgc 1020
tttccaaaaa tgcttgaact tttatgttgt taagaaatat ataatgatat cttacattaa 1080
gcatgagtct aatttgtatt aattgggatg gactaaattt tcatttgatt atcaggaaaa 1140
ttaaggagtt atatatttaa aagcaatttt ctgtgttttc ttctttgtaa gttgactcat 1200
ttgtgaagca attaggcaaa ttttgagaag atcattgtta ttgtggtttg cagtatatat 1260

ttcttagtaa atatcactta agattaaatt tttcagaaag aaaattatag ctttttttccc 1320
aaaatatttt taagatttaa tctttttgta gtatgctaca gatttaatta tattaactct 1380
tttttaagac attgaccatg acttaacatt ttgccttcta acacctttta aatctatgta 1440
ctttaatagt taagagaaaa taagtttgca gatttttaat aatctgtttg taaaaggcta 1500
tctctaagcc tagtatgtgg gtaattttac aggtgtgttt tttgataact ttaatataaa 1560
ataaactcat tttatttgtg gcaattcgcg tttctttttt tatgccagag tacatatgtt 1620
ggattccatg aattggtatt acttattatt atgtgttgat taaatatatg cacacactta 1680
ggattacaga tcacagagca aattatgaaa atcataaaca ttctggtatg gtcatccata 1740
ggattatgaa aaagaaa 1757

<210> 40
<211> 1945
<212> DNA
<213> Homo sapiens

<400> 40
accgggagct ggtgacggat ggcggggccg ccagcccctg gcgctgcaac tgggaacagt 60
tgttgaaccc gcgaccaagc gaggcggacc ctgaagcgga ccccgaggaa gccactgctg 120
ccagggtgat tgacaggttt gatgaagggg aagatgggga aggtgatttc ctagtagtgg 180
gtagcattag aaaactggca tcagcctccc tcttggacac ggacaaaagg tattgcggca 240
aaaccacctc tagaaaagca tggaatgaag accattggga gcagactctg ccaggwtcgt 300
ctgatgagga aatatctgat gaggaagggt ctggagatga agattcagag ggactgggtc 360
tggaggaata tgatgaggac gacctgggtg ctgctgagga acaggagtgt ggtgatcaca 420
gggagagcaa gaagagcaga agccactctg caaaaacacc gggcttcagt gtccagagta 480
tcagtgactt tgagaaattt accaagggaa tggatgacct tgggagcagt gaggaggagg 540
aagacgaaga gagtggcatg gaagaagggg atgacgcgga agactcccaa ggcgagagtg 600
aggaagacag ggctggagat agaaacagtg aggatgatgg tgtggtgatg accttctcta 660
gtgtcaaagt ttctgaggaa gtggagaaag gaagagccgt gaagaaccag atagcactgt 720
gggaccagct cttggaagga aggatcaaac tacaaaaagc tctgttgacc accaaccagc 780
ttcctcaacc agatgttttc ccattgttca aggacaaagg tggcccagaa ttttccagtg 840
ccctgaaaaa tagtcacaag gcacttaaag cattgttgag gtcattggta ggtcttcagg 900
aagagttgct tttccagtac ccagacacta gatatctagt agatgggaca aagcccaatg 960
cgggaagtga ggagatttct agtgaagatg atgagctggt agaagagaag aagcagcaac 1020
gargaagggt ccctgcaaag aggaagctgg agatggagga ctatcccagc ttcatggcaa 1080
agcgctttgc cgactttaca gtctacagga accgcacact tcagaaatgg cacgataaga 1140
ccaaactggc ttctggaaaa ctggggaagg gttttggtgc ctttgaacgc tcaatcttga 1200
ctcagatcga ccatattctg atggacaaag agagattact tcgaaggaca cagaccaagc 1260
gctcygtcta tcgagttctt ggcaaacctg agccagcagc tcagcctgtc ccagagagtt 1320
tgccagggga accggagatc cttcctcaag cccctgctaa tgctcatctg aaggacttgg 1380
atgaagaaat ctttgatgat gatgactttt accaccagct ccttcgagaa ctcatagaac 1440
ggaagaccag ctccttggat cccaacgatc aggtggccat gggaaggcag tggcttgcaa 1500
tccagaagtt acgaagcaaa atccacaaaa aagtagatag gaaagccagc aaaggcagga 1560
aacttcggtt tcatgtcctt agcaagctac tgagtttcat ggcacctatt gaccatacta 1620
caatgaatga tgatgccagg acagaactgt accgctctct ttttggccag ctccaccctc 1680
ccgacgaagg ccacggggat tgacatcgcc cacctccgac acccagtggg cgccttggct 1740
ggtgcggctg ctggtccaga tggaggaaac cagtgacttt atggggctga gctagtaggg 1800
aagcccctgg aaagatgctg cgttccgaac ctgtgcctaa tacacgcaag ggcgctgtcc 1860
cgcccaaccc cgcctttaaa cgccacaaat aaagagcatt gttaccgcca agtacgacgc 1920
ggccgcgaat taccggaccg gtaac 1945

<210> 41

<211> 588
<212> DNA
<213> Homo sapiens

<400> 41
aggcgtatac caccatgact gaaaacaaaa gacttttttt tgagactccc tctcaaaaac 60
aaaacaaaac aaaaaaatta gacaaatgct acattaatgt ttgggtggtc agattctact 120
ttgaatctga agtttgcaga tatgcctata gatttttgga gtttaccact ttcttattct 180
gtatcattaa tgtaatattt taaattacta tatatgttac catttttctg gatttagtaa 240
gaaatttgca gttttggttt gatgtaacaa gggttttaat gtaatttatg ttagattttg 300
catttttttc attactgtta tattttaacc tgactgactg atctaattgt attagtattg 360
tgaataatca tgtgaaatgt tttgagacag agtactatat ttgtgaatat aattttatgg 420
tttttttcac ttagaacctt tctgtgtgga aaactaagaa aattgctttc tgctgtataa 480
tctggcattc attgtagatt aaagcttatt tttctgtgaa taaaacgtat tcaataaaat 540
actattcttt aaaattawaw mawaaaaaaa aaaaaaaaaa aaaaaaa 588

<210> 42
<211> 1568
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (104)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (112)
<223> n equals a,t,g, or c

<400> 42
cattagattt cacttttta aaaaacccag tggacattgc tataaataag atttatttgg 60
ctacaaataa cctgggatgt tgcttattat gattgatgcc tgcnggtttg tncccaagct 120
gagtgaaatt gaacctcgtc ctccctactc attttgatga ctgaggctgg tttataagaa 180
aaggaagttt ggagaagaaa accgagatta gaaaatatca tgttttggtt ggagataaga 240
accagggatg gcaagtacca gtgtgtacaa atgtatttca cggagtttga aggaacgcat 300
aatcaagagg gaaaacaatt tgtccttcat tggacgtatt atttggattt gggtgagcaa 360
caaaatggaa tgtggtctgt taggagcatt ctgtttgttc ttttgtccct gatgtgatga 420
atcattgcca catgctagat ggactcttca tatccaggtt ttgtccctca gggctgagca 480
ctgtattaaa gagtttttgt tgagtcattt aaccttagtg tccacatcca gatcagctgt 540
aaaatgggga agacgtgtgc tgatttggaa tgaatgcaaa atatcactat catttcccta 600
attacagagg agcaaaggtt atcttcagcc ctttcagttc tatgctcaca tattcaaata 660
tcaaatgtaa tttagctgaa gttatttaat aatcaagtct ttcaatatct gttcaaagaa 720
aaagaacaca ctttgaaaat tctgcaaagc tgtctcccag tctttaaaat gtctggaagc 780
actctccttc tttacaatac caacatcact ggcccagaat cttccctgtg ctaggttgta 840
aatataaata aattacttgt tttgtaaact tttgtaaaga atattttggt agaaatactt 900
caaacatatt ctttgggtta tatttataca tatgtgaaat aaatatacta tcaaaaggtt 960
atattttata caaaaagtaa attgctacct tttgtatgct aatatgcaaa gttttgtata 1020
atatgatggt ttatttttag ctctacactt aaaccatagg tggttgagtg ggaacttttg 1080
aaaactatca agaggcttgt tagacaaatt tatattctga aacctcaata agaaagcatt 1140

ccaggtttca atccttgttt tttgtcctgc tcccaaattc ttttttaaac ccatagttct 1200
tgtgtcttat ttgattcttc tgctgtgcac attgtattgg tccttgttgc atgtagtcta 1260
ctgtgtgttt tccgatttta taaggcagca tttctccata caaaaaraaa aaaaatgatg 1320
tacatataaa cgcttttrtt gtatggctcc tccatgttac tgtatatatc tgccagcact 1380
tcccagttac actcctgtga gtcagcttat ttttacccta acataaatag tatgttttgt 1440
agtagttatc aaatttaaga gataaagcaa tcagaatgtt tggattttct tctatcttaa 1500
tgtgaatttc ataattaatg tctatttatt cagctattca ttaaaataca ggattctttg 1560
gggaaaaa 1568

<210> 43
<211> 1060
<212> DNA
<213> Homo sapiens

<400> 43
gcttgtcatg agaaggtggt aaatatccaa aaagaccccg gtgaatctct cggcatgacc 60
gtcgcagggg gagcatcaca tagaraatgg gatttgccta tctatgtcat cagtgttgag 120
cccggaggag tcataagcag agatggaaga ataaaaacag gtgacatttt gttgaatgtg 180
gatggggtcg aactgacaga ggtcagccgg agtgaggcag tggcattatt gaaaagaaca 240
tcatcctcga tagtactcaa agctttggaa gtcaaagagt atgagcccca ggaagmctgc 300
agcagcccag cagccctgga ctccaaccac aacatggccc cacccagtga ctggtcccca 360
tcctgggtca tgtggctgga attaccacgg tgcttgtata actgtaaaga tattgtatta 420
cgaagaaaca cagctggaag tctgggcttc tgcattgtag gaggttatga agaatacaat 480
ggaaacaaac ctttttttcat caaatccatt gttgaaggaa caccagcata caatgatgga 540
agaattagat gtggtgatat tcttcttgct gtcaatggta gaagtacatc aggaatgata 600
catgcttgct tggcaagact gctgaaagaa cttaaaggaa gaattactct aactattgtt 660
tcttggcctg gcactttttt atagaatcaa tgatgggtca gaggaaaaca gaaaaatcac 720
aaataggcta agaagttgaa acactatatt tatcttgtca gtttttatat ttaaagaaag 780
aatacattgt aaaaatgtca ggaaaagtat gatcatctaa tgaaagccag ttacacctca 840
gaaaatatga ttccaaaaaa attaaaacta ctagtttttt ttcagtgtgg aggatttctc 900
attactctac aacattgttt atattttttc tattcaataa aaagccctaa aacaacaaaa 960
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa gggcggccgc tctagaggat 1020
ccaagcttac gtacgcgtgc atgcgacgtc atagctcttc 1060

<210> 44
<211> 1344
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (144)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (163)
<223> n equals a,t,g, or c

<400> 44
cccacgcgtc cggggccacc agggcctcct ggccccccctg ggcccccagc ccctgttggg 60

ccaccccatg cccggatctc ccagcatgga gacccattgc tgtccaacac cttcactgag 120
accaacaacc actggcccca gggnacccac tgggcctcca ggncytccag ggcccatggg 180
tccccctggg cctcctggcc ccacaggtgt ccctgggagt cctggtcaca taggaccccc 240
aggccccact ggacccaaag gaatctctgg ccacccagga gagaagggcg agagaggact 300
gcgtggggag cctggccccc aaggctctgc tggggcagcg gggggaactg gccctaaggg 360
agaccctggt gagaagagcc actgggctcc tagcttacag agcttcctgc agcagcaggc 420
tcagctggag ctcctggcca gamgggtcam cctcctggaa gccatcatct ggccagaacc 480
agagctgggg tctggggcgg gccctgccgg cacaggcacc cccagcctcc ttcggggcaa 540
gaggggcgga catgcaacca actaccggat cgtggccccc aggagccggg acgagagagg 600
ctgagggtgg tggcggcccc tgaggcagac caggccaggc ttcccctcct acctggactc 660
ggccagctgc ctccagggac cgcccgtcca tatttattaa tgtcctcagg gtcccttctg 720
ccatctaggc cttaggggta agcaggtctc agtcctggca ccatgcacat gtctgaggct 780
gagcaagggc tgagaggaga ggcttgggcc tcagtttccc tctgtgaagt gggggaggc 840
aggccttcaa ggagggatag aggtacaagg cttcgtctca tctgctgtct gagcatccag 900
gcccaaaggc actgagggag tcaggagctg gggctcggca catgcagaga tgacagggca 960
gggggcagtc ttcctccccc tccccgacca aacctcgggg agccctcctg tgcccctccc 1020
tccttgttgt ccagtgctgg gytccccacc ccgaggtcag gctgcccaat cctctgactg 1080
gatcaccggg ggcttcttgc ctcagttctt ccctctgagc cccagggccc tcccgcatct 1140
caggttgggg atggggacat ggagaggaag gggccgccta ctcctgcaaa tgcttgtgac 1200
agatgccagg aggtagatgt gtgctggcca ataaaggccc ctacctgatt ccccgcaaaa 1260
aaaaaaaaaa aaaaaaaaaa aaaaaaaagg gcggccgctc tagaggatcc aagcttacgt 1320
acgcgtgcaa cgcgggtcat agct 1344

<210> 45
<211> 892
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (890)
<223> n equals a,t,g, or c

<400> 45
ttgagaagtt ggatgaatat atatatagac acttctttgg tcacactttt tcccctccat 60
atggacccag tcgacctgat aaaaagcaac gtatggtaaa tattgaaaac tccaggcatc 120
gaaaacaaga gcagaagcac cttcagccac agccttataa aagggaaggt aaatggcata 180
aatatggtcg cactaatgga agacaaatgg caaatcttga aatagaattg gggcaattac 240
cttttgatcc tcaatactga ttcacaattg agttaaatta gacaactgta agagaaaaat 300
ttatgctttg tataatgttt ggtattgaaa ctaatgaaat taccaagatg acaatgtctt 360
ttcttttgtt tctaagtatc agtttgataa ctttatatta ttcctcagaa gcattagtta 420
aaagtctact aacctgcatt ttcctgtagt ttagcttcgt tgaatttttt ttgacactgg 480
aaatgttcaa ctgtagtttt attaaggaag ccaggcatgc aacagatttt gtgcatgaaa 540
tgagacttcc tttcagtgta agagcttaaa gcaagctcag tcatacatga caaagtgtaa 600
ttaacactga tgtttgtgtt aaatttgcag cagagcttga gaaaagtaca ttgttctgga 660
atttcatcat taacatttta taatcttaca ctcacttctt gtctttttgt gggttcaaga 720
gccctctgac ttgtgaagaa tttgctgccc tcttaagagc ttgctgactt gttttcttgt 780
gaaatttttt gcacatctga atatcgtgga agaaacaata aaactacacc atgaggaaaa 840
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaccccgg ggggggcccn ga 892

<210> 46

<211> 496
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (496)
<223> n equals a,t,g, or c

<400> 46
aattcggcag agtcggagtg tggtacttct cctagttgca gtcaggcttc atacgctatt 60
gtcctgcccg taagttcccg ttttgtgtgt ggttagagca gccagcgggt acagaatgga 120
ttttggaaga gggagtcacc actggacctc caaggaagcc acgtgcagac atctacaacc 180
ttcgatctcc tgacgagttt attgttggcc aaaaccaggc tttgattgaa ccaggatgaa 240
tgcgggtgtt ggaagtagaa tatatatata catataaaat tgaaactggc gatggaatat 300
gagaggagcc ctctggaaag aaaaggacag accctgtgct ttcatgaaag tgaagatctg 360
gctgaaccag ttccacaagg ttactgtata catagcctga gtttaaaagg ctgtgcccac 420
ttcaagaatg tcattgktag actttgaaat ttctaactgc ctacctgcat aaagaaaata 480
aaatctttta aatcan 496

<210> 47
<211> 1229
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (764)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1165)
<223> n equals a,t,g, or c

<400> 47
attcggaacg agagctgata tggaagggtt atttctttct ggccaatact ttttggtatt 60
tctaaatatt gcaatcttga tttttactat taaatttgtt aattgtcagt tctggctttt 120
ttgcataaag agttggtcca ttaacttgcc aatttgaagc ttctaactag atattcccta 180
ctgaaagttt tggatttgtt tttagtttgt ggagcagtct tagctgggga caggtaattg 240
acaacggcag agatactttc ttttcctagg attctaagtc tgtaatccac atcctcaatg 300
tattcacagg actttaaaat tctctccaaa tgaggraggg aaatatcctg gtgctttcta 360
atgggttact aaaagttgtg tttagaacaa cagattttaa taggcatctt cctttgttat 420
gtgtcattag ccctttgccc gtttacctta gggctctttg aaggagaaat ggatgggaga 480
aaacctgtca cttggcgaaa gtaaaaggga taattaactg gctcagagct tatgtgcaga 540
gttccaagcc ccaaagttaa tctagaacca ctcgataaca ccaataaaaa tatttatttc 600
acatctgtta tatatctgga aaatgktcta agcatcttac acatatttct cattaaatcc 660
acaggtgacc attgtgaggt agawattttg ktctaawttt ccagatgagg aagctgagac 720
cctaaaaggt taggtgacag gttatacaac ttggagtgtg ggangaggag agaggaacct 780
gaacagggca agttggggat ctgacttttg tttgggtaga tgtaagcaca ttgtattttt 840
ggcttagatg ctttattcat catggctgaa ggtaatacca tttactcact caccgaaaat 900

tgtttacaat aatctagatg aatttgctgt ctttggacat ctgtcttttg actggacccc 960
agtatatagt ctgtggaagc tcacttaagg agaragctcc tttttgtttg gttagagaaa 1020
ttttctgtcc taaaagtaga aatagcccct tctaggtaag gatggagcat ttgatcatac 1080
tggtttcatt atattcctct aacaggttgg aaccgattgt ttttgagtac ttgtttcaaa 1140
cttctgagta ttttccttct ggaanatagc tcagtgtttt aaaatttaca tgaacttaaa 1200
aggttaattt ttttttaaaa gaatggtta 1229

<210> 48
<211> 1411
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1410)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1411)
<223> n equals a,t,g, or c

<400> 48
catcctggct ccttgagtgg gagtratatc acctctatcc taactgtcct tgtccctcct 60
ctccccacag ctggattatc accgaggcct cttggtggac cgtccctctg aaactaagac 120
agaggagcag ggaataccac ggcccctgca ccccccaccc ccaccccccgg tccagccacc 180
acagcacccc cgggcagagc agcgggagca ggaacgggca gtgcgggaac agtgggcaga 240
acgggaacgg gaaatggagc ggcgggagcg gactcgatca gagcgtgaat gggatcggga 300
caaagttcga gaagggcccc gttcccgatc aaggtcccgt gaccgccgcc gcaaggaacg 360
tgcgaagtct aaagaaaaga agagtgagaa gaaagagaaa gcccaggagg aaccacctgc 420
caagctgctg gatgaccttt tccgaaagac caaggcagct ccctgcatct attggctccc 480
actgactgac agccagatcg ttcagaaaga ggcagagcgg gccgaacggg ccaaggagcg 540
ggagaagcgg cgaaaggagc aagaagaaga agagcaaaag gagcgggaga aggaagccga 600
gcgggaacgg aaccgacagc tggagcgaga gaaacgtcgg gagcacagtc gggagaggga 660
cagggagaga gagagagaaa gggagcggga cagggggggac cgagatcggg atagggaaag 720
ggaccgagaa cgaggcaggg aaagggatcg cagggacacc aagcgccaca gcagaagccg 780
gagtcggagc acacctgtgc gggaccgggg tgggcgccgc tagctgggaa aacactagag 840
ctgcaggtac cagccactcg gccccagggg gttatggcca cagagggata ggcacagtct 900
ccaccaccct ggagccaagg gtctttcaca tcacctatcc ctacatacat accaaatgga 960
aaagtggcca tccttttccc cccaaacaca ccccccttaac ctatctcttg ggacttagcc 1020
cgaccctccc tctcatttcc cattaagtct gagaggcaag agctaggtta ggcaaggagg 1080
tggttggcca gagatgggga acagccaggt gccccagtcc tctgattttt cctccatcct 1140
gcttaccacc tccctgggta cttacagcct tctcttggga acagccgggg ccaggactgg 1200
gtcacctatg agctgaatca gcatctcctc ctgagtccca gggcccctgc agttcccagt 1260
ctcttctgtc ctgcagccct tgcctctttc ccacaggttc cactttatat ccaccttttc 1320
cttttgttca atttttattt ttattttttt tattattaaa tgatgtggtc tatggaaaaa 1380
aaaataaaaa tctgacttag ttttaaaaan n 1411

<210> 49
<211> 1685
<212> DNA

<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1606)
<223> n equals a,t,g, or c

<400> 49
cgctnttccc ccccacaccc gtgtggccag ggatccccgc atggcccatc ttagaaactc 60
aactatttgg tggatgctaa acacttcact tcaggcaatc ccaaggcatt tgctccaggg 120
tatccgatga gattacagct gttaagcttg ctttccattt cataacttgc tgtgcagcta 180
gttaccaccc ccatgctgaa gagtaaagca aagtgccgtg gttcggcagt ggaatccacc 240
cccagcactc tgctcgcact ggagcgttca agtccggtta tgtgagaaca gactaggact 300
ctcttgctgc ctctaattgc atttcactgt caccctcccc agtnttctga tggtgtgcat 360
gtgaggagaa gatgaggtta ggactgagaa gtgcagaagt tggaacagtg gtaaggctgt 420
tttaaaataa gatgttttgt tttaataata tgctcctggc acaaagctag gagtaaatgt 480
gactccaaag ggagttcagt taatctctga aatgcacaaa acctagctat tttctccctc 540
tcatcacagt ctgagtctgg tccattgcta ccccaattct ctggggacat aaaaccaggc 600
tggaaaggga ccaggaagtt tgaaatagtg acatatcatc cactagtccc aagggctaag 660
gaatagtgag tttattctgg aaggaactgg gaagcttagt ctaattagtg cctggggatg 720
acctatgcaa tcacaccgct tatgaccatc ctagagaggg ccctgagcac cagcttgatc 780
ttagggattt ccaaagtaac ctgctttttg cctggatagg gttaaaatag acctttcttg 840
cctatccttg ccttaaccta tctgcctgag gttggcctga gattgtgagt caacgacttt 900
gctatctttt cctcagtgtt gaactttcat taagaaataa agtcctagct tcttacagag 960
aggggtccaa atggtgaatg ctcatcctgc ctgggattca aggaattagc tcagagrttg 1020
gcccctagct tttctgcctt tgtaggggac agcaaaaggg gaaaatttgc tgcagaaaat 1080
tccaaaagat tgctgtagct ctcacaggga agtggtaaag atcagctaaa cctgggttgg 1140
ggtgctttct gcccagtggg tcttggcata agtagattaa tcctgctctt ttaagaaaag 1200
gcaacttatt caggcagtct ggaaaggggg ttctcagaaa actcagtttc tttattcctt 1260
cttttctccc aactactgtt actggttata gaggtctttg gactctaaag accaatgttt 1320
ggccactaac tggactaata tgtatctttc tgtgatttca tcatagaggt ctgttttgtg 1380
agggtttggg gtgcagaaaa ctttgattaa atcttaatgg gaggctgggt gacctggatt 1440
atctacagtg agcagactta aatggaacag aagtttatgt gtccaaatga tggaatcatt 1500
aaacctgagt gacttgacct gtgtggttcc ttaatagtat ctatatatct agacaaaaat 1560
agattgtgaa tgtaaatggt gaatgaaaag gatggaaata atgttntcat atgttaatcc 1620
atgagcttga atccagggag gaatacctcg gtgctttaac caccttagtt ataacacatt 1680
tctta 1685

<210> 50
<211> 660
<212> DNA

<213> Homo sapiens

<220>
<221> misc feature
<222> (515)
<223> n equals a,t,g, or c

<400> 50
cggcacgcgt gggcctactt tcacgcttcc tcccctcccc ctcctccctt atcccttcgc 60
tttcgctctt ttccgtcgag gccgacccct gagttgtgag tctggggtct ggttggtgaa 120
aaagagccct tgaagctgga agacgggaga ggacaaaagc atgtcttccc ttcctgggtg 180
cattggtttg gatgcagcaa cagctacagt ggagtctgaa gagattgcag agctgcaaca 240
ggcagtggtt gaggaactgg gtatctctat ggaggaactt cggcatttca tcgatgagga 300
actggagaag atggattgtg tacagcaacg caagaagcag ctagcagagt tagagacatg 360
ggtaatacag aaagaatctg aggtggctca cgttgaccaa ctctttgatg atgcatccag 420
ggcagtgact aattgtgagt ctttggtgaa ggacttctac tccaagctgg gactacaata 480
ccgggacagt agctctgagg acgaatcttc ccggnctaca gaaataattg rgattcctga 540
tgaagatgat gatgtcctca gtattgattc aggtgatgct gggagcagaa ctccaaaaga 600
ccagaagctc cgtgaagcta tggctgcctt aagaaagtca gctcaagatg ttcagaagtt 660

<210> 51
<211> 1572
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1555)
<223> n equals a,t,g, or c

<400> 51
tnagtgaaag aatgtgccat attacatatt gcaacctaat ttgttaaaac taactccagc 60
actaaagctg aaatgccaca aacactaaaa gtataaatat gtctgatttt tgaaacacat 120
aagctttgct ctttaggcag gaatgatctt ttcaaatcat tagcacaata tttaaatatc 180
taaaaattta agagatccat actttctgta gctttacaat taatttaagt actaaaaaga 240
caaggatttc ttttaagaaa tttatagcat ttactgtgtt atttaaatgc taagccaaag 300
tatctgcact taggtatacc tctttatgcc aataatgatt ttaatgaagg ctcttttcag 360
atgtaacctt atgaaggaaa tatctgcttt gtgtatatgc cagttagaat actggtttct 420
aaagtctgtc aaattgtatt tcagtggcac aaaaaccagt tttgaggtct tagacttata 480
attctttgaa taaaactgat aacttatttg tataattgga gtggagacct acctccataa 540
ttagataaac tctttttgga ttataatcag aattttgcct tttttcttct caaattatta 600
catatgtatg tattatatat ccacatatat agtttccct gattaaatgg atattaaaat 660
aattgcgggt gcttcaggac tttttgcttc tatatttaag tatattgttt ttatagcaag 720
aacatattct gaatgtttta taaatcttta ataatttata tgtaggtaat atttttgtat 780
cacaatgcat tattttttc ctcctttcct tccaaactat accactgtat ttaccacttc 840
taagagtgac tgacgacggg ccagatgacc cttgaagtag tcattatgta gcaataaatg 900

aagcctgaaa caggtttttt tacttccact ttaatcctta gaaatttctt ggcaacttcg 960
catattttca ttgacaccgg tgtataagta taaatttaaa tgaactaatt acttttgcat 1020
attttaaatt ctttatatgg tagttatttt ttataacagg atattaacat aagttaaatc 1080
ctatgtattt gaaattgtta cagagctttc ctctttactt caaacagcaa aaaagtgggg 1140
ggcatattgt agtcctgtca tttaagttat gtwaaaaatt taatcattat tttgatgctt 1200
taaacattct catgtgtaat atatgttttt gtatcaaaaa cactcatata tttcaagaaa 1260
aagaaattat gttaaatagc cctgttttaa gaaaaatatt tatgaagcat ctcaacttga 1320
agatcaagtc aaagttataa ctcaggatct gargtctcaa gctaggagag actgagaatt 1380
ttaatcagtt tgggcatata rtttggactg aatcacatct gtagtactta gccaaagaca 1440
atttggarga raatatcagc cttctggaar tagctacttc ctgaacaatg taaagtgtcg 1500
caratattca ataaaatggc aacctgttaa aaaaaaaaaa aaaaaaaaaa acccnaaggg 1560
gggggggccc cg 1572

<210> 52
<211> 635
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (632)
<223> n equals a,t,g, or c

<400> 52
gctgctccag ctgttcgaag gtgatccaga cgcaagatgg ctgtcctctc taaggaatat 60
ggttttgtgc ttctaactgg tgctgccagc tttataatgg tggcccacct agccatcaat 120
gtttccaagg cccgcaagaa gtacaaagtg gagtatccta tcatgtacag cacggaccct 180
gaaaatgggc acatcttcaa ctgcattcag cgagcccacc agaacacgtt ggaagtgtat 240
cctcccttct tatttttct agctgttgga ggtgtttacc acccgcgtat agcttctggc 300
ctgggcttgg cctggattgt tggacgagtt ctttatgctt atggctatta cacgggagaa 360
cccagcaagc gtagtcgagg agccctgggg tccatcgccc tcctgggctt ggtgggcaca 420
actgtgtgct ctgctttcca gcatcttggt tgggttaaaa gtggcttggg cagtggaccc 480
aaatgctgcc attaaagaat tataggggtt taaaaactct cattcatttt aaatgactta 540
cctttatttc cakttacatt ttttttctaa atataataaa aacttacctg gcatcagcct 600
catacctaaa aaaaaaaaaa aaaaaaaaac tnggg 635

<210> 53
<211> 1367
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (106)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (958)
<223> n equals a,t,g, or c

<400> 53
ggccacgttg ttatctcttt gatcaagttg ttttacgtgt cacagtagag tctgaccagt 60
taccataacc aaacattttg tgcgtgtgct attgttgctg cgatantctc ctttgggtgg 120
aacacagtga agatcgacat gagtgcagcc cggagagatc ctcttccaat tgttccattt 180
ggattagctg catttgctac cactttgttt gccttgggat tagctttagg aacaaccata 240
gctgttggga tgttgttttt tatccagatg aaaataattc tcagaaacaa aacttctatt 300
gagtcatgga ttgaagagaa ggctaaagat cgaattcagt attatcaact agatgaagtc 360
tttgtttttc catatgatat gggaagtaga tggaggaact ttaaacaggt atttacgtgg 420
tcaggggtcc ctgaaggaga tggacttgag tggccagtaa gagaaggctg tcaccaatac 480
agcttaacaa tagaacagtt gaaacaaaaa gcagataaga gagtcagaag tgttcgctat 540
aaagtaatag aagattatag tggtgcctgc tgccctctga ataaaggaat caaaaccttc 600
ttcacaagtc cctgcaccga agagcctcga atacagctgc aaaaagggga attcatttta 660
gccacaagag gtttacgata ctggttatat ggagacaaaa ttcttgatga ttcctttata 720
gaaggtgttt caagaataag ggggttggttc cctagaaaat gtgtggaaaa gtgtccctgt 780
gatgctgaaa cagatcaagc cccagagggg gagaagaaaa atagatagct gctgttaaaa 840
caaaattatc ctttaagtct gcttaattac ttgaaaattg tacatattac taaagaatta 900
tgcaatgagc ctactctggt taagatgttc ttttcctcaa aggtgcccta gtgccatnga 960
tttaaatatt tttattacca ttttgaaatg gagaagccat tctgcatatg cctttgaatt 1020
cctgcccctc tttaccacct cttcctcccc ctcaaaggaa aaacatttca tccaagtaag 1080
ttaacggcat tttctgtagg attttcctta tgcactgcac actctggacc tcacctgcag 1140
atacagttcc cccccttgcca ggagcatctg catgtggtac ttctcttttc cctcagttga 1200
tatttcttat atgatattct agatactata gaactcaatt tgtcagattc agtataacct 1260
cagattttgt tacctgtctt ttaaaaatgc agattttgtc aaatcaaata aagatcaatg 1320
gatgttgggt ataawmaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaa 1367

<210> 54
<211> 378
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (363)
<223> n equals a,t,g, or c

<400> 54
ggcagtggta gggngtgaga accctgggnc ctgctgaaaa gcctcctctg taggaggtca 60
cccagcagga caragaagca ggaggaggac agggccacar aggaagccaa gaacggtgaa 120
aaggccaggc ggwgttcara ggaggtggac ggccagcacc cggcccaaga ggaggtcccg 180
gaatcgcccc agacctctgg cccagagcag aaaataggtg tgggagcccc agggaggaaa 240
agccarytgg agaggaagca gagwtggaaa aggctacaga ggtgaagggg gagagggtgc 300

aaaatgaaga ggtgggacct gaacatgaca gccaagaaac aaagaagctt gaggagggag 360
ctncagtgaa ggcgaccc 378

<210> 55
<211> 1058
<212> DNA
<213> Homo sapiens

<400> 55
tcgggtatga ggctgggact aagccaaggg attcaggtgt ggtgccggtg ggaactgagg 60
aagcgcccaa gcttttttgt tctgaactcc cactgcgttg tggattcctg aggatgggat 120
gactgtatct tgattacccg gagttttcaa gatggcagca tctatgcatg gtcmgcccag 180
tccttctcta gaagatgcaa aactcagaag accaatggtc atagaaatca tagaaaaaaa 240
ttttgactat cttagaaaag aaatgacaca aaatatatat caaatggcga catttggaac 300
aacagctggt ttctctggaa tattctcaaa cttcctgttc agacgctgct tcaaggttaa 360
acatgatgct ttgaagacat atgcatcatt ggctacactt ccatttttgt ctactgttgt 420
tactgacaag ctttttgtaa ttgatgcttt gtattcagat aatataagca aggaaaactg 480
tgttttcaga agctcactga ttggcatagt ttgtggtgtt ttctatccca gttctttggc 540
ttttactaaa aatggacgcc tggcaaccaa gtatcatacc gttccactgc caccaaaagg 600
aagggtttta atccattgga tgacgctttg tcaaacacaa atgaaattaa tggcgattcc 660
tctagtcttt cagattatgt ttggaatatt aaatggtcta taccattatg cagtatttga 720
agagacactt gagaaaacta tacatgaaga gtaaccaaaa aaatgaatgg ttgctaactt 780
agcaaaatga agtttctata aagaggactc aggcattgct gaaagagtta aaagtaactg 840
tgaacaaata atttgttctg tgccttttgc ctggtatata gcaaatactc aaaaagtatt 900
caataattca atcaataaat ataagtttca tcttacacgt aagatacagg tcttatctcc 960
tgatggtgtg tccattttgc ctggtatata acagataata aatatccagt gtcaataaat 1020
gtaacaataa aagtttcatc tttcctcttt gtatgtgg 1058

<210> 56
<211> 682
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (667)
<223> n equals a,t,g, or c

<400> 56
gggnccggaa catattccct tactcaaaag attgcatgac tgaatttgct taaggaaaaa 60
aaaaattgta tcaagtccat taatacaatt atacattaat tatattacat taatacaata 120
tatggtttgt gaattcagag acattaccag tttgcctcct tctctcaata gaacttgtat 180
tttcattttc ttggttaagc agttgtctcc taatattatc ccatatgcta cctagtttgc 240
tggtcccaag cagtttactg tacttcacta gatttggtac ctgctctccc ctggacttct 300
ttttcaatat tctagccttt cctagatgta aatctttacc tccttgttag tgaaattaga 360
tataagccat gatttggaga gggaagaaat ctggaatact taatttcatt taattatcta 420

tgctgatgaa tgcctgtatc attgttaata aaggagaatt gaaaatactc atttctactt 480
tctgccctca aatttctgtt tctatctcaa ctaggcaaga atcagcaggg tgcatgaygc 540
cattttaagc tgcttcacat cagactgaaa tcctaattac agttcataag tgaaacagac 600
taattcmatg ggcaatacct ttkgtawagg tccygtgctt aaaggaggca agtataaatt 660
ttcccantaa ggaatccccg gt 682

<210> 57
<211> 644
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (27)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (458)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (619)
<223> n equals a,t,g, or c

<400> 57
ggagnctggg cctgtgcggc ggccgcngta gcgctttgga aggcgcacgg ggcgaagatg 60
gcggcggacg acaggaggcg ctgagggagt tcgtggcggt gacgggcgcc gaggaggacc 120
gggcccgctt ctttctcgag tcggccggct gggacttgca gatcgcgcta gagcttttta 180
tgaggacgga ggggatgaag acattgtgac catttcgcag gcaacccca gttcagtgtc 240
cagaggcaca gcccccagtg ataatagagt gacatccttc agagacctca ttcatgacca 300
agatgaagat gaggaggaag aggaaggcca gaggtgagtc ttctagaggg ggtcaggggg 360
acagttcaca gggaagtcca gggtaatgtg taaatcacct agaacaggac ctggtaaaac 420
atgtttggtt tattgttagc cattactact gtgggctngt ctgtgtgggt tatatcttag 480
gaagtctctt ctactccttg tagcttagaa gtgacccctg ttccgttact taatgtattt 540
attgaggaat attaggggag ggaaaccaag gaaaagatct agcattccca ctttttggta 600
ttgactaaaa aggatttgna aatcagtttg taaaagaagg tgtc 644

<210> 58
<211> 766
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature

<222> (760)
<223> n equals a,t,g, or c

<400> 58
gggtcgaccc acgcgtccgg aatgttttgg tgaataaatc tgttcttcag caaccctacc 60
tgcttctcca aactgcctaa agagatccag tactgatgac gctgttcttc catctttact 120
ccctggaaac taaccacgtt gtcttctttc cttcaccacc acccaggagc tcagagatct 180
aagctgcttt ccatcttttc tcccagcccc aggacactga ctctgtacag gatggggccg 240
tcctcttgcc tccttctcat cctaatcccc cttctccagc tgatcaaccy ggggagtact 300
cagtgttcct tagactccgt tatggataag aagatcaagg atgttctcaa cagtctagag 360
tacagtccct ctcctataag caagaagctc tcgtgtgcta gtgtcaaaag ccaaggcaga 420
ccgtcctcct gccctgctgg gatggctgtc actggctgtg cttgtggcta tggctgtggt 480
tcgtgggatg ttcagctgga aaccacctgc cactgccagt gcagtgtggt ggactggacc 540
actgcccgct gctgccacct gacctgacag ggaggaggct gagaactcag ttttgtgacc 600
atgacagtaa tgaaaccagg gtcccaacca agaaatctaa ctcaaacgtc ccacttcatt 660
tgttccattc ctgattctwg ggtaataaag acaaactttg tacctcaaaa aaaaaaaaaa 720
aaaactcgag ggggggcccg gaamcaattc gggctatagn agagcg 766

<210> 59
<211> 2361
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1174)
<223> n equals a,t,g, or c

<400> 59
gttctagatc gcgagcggcc gccctttttt tttttttttt tttggaaagc aaggatcaca 60
cttccccctc cctgttcctt aatccctttt ctaaaaaggg gggaaaatcc ggatggattt 120
tagggattgg tctggtgtca gctgtgtttt attgcacacc taaatcctga ttataggctt 180
ttcatttctc cgcaaagcct ttattttggc agttaagcca aatgtgtttt ccagaaagtt 240
agttattttc tcctctttct ttcctttctt tcctcccttt ttcccgtctg accccaaacg 300
ttattgtcca aacatgactg gacagcagct tttgtttctt gaccctgtaa tatgacagtc 360
tgctaatatt gacagaaggt gcagtttttg ggttatagtc gtgattttcg ctaatcaatc 420
atattagcag gaaaaaaaat gacttgtttc tgttgtactt gagtcttaag aaaaagtgcc 480
catagtttag tgacaatttc caaaggcttt agtaccacct gtatttcaaa atgggggacc 540
caaactcccg gaagaaacaa gctctgaaca gactacgtgc tcagcttaga aagaaaaaag 600
aatctctagc tgaccagttt gacttcaaga tgtatattgc ctttgtattc aaggagaaga 660
agaaaaagtc agcacttttt gaagtgtctg aggttatacc agtcatgaca aataattatg 720
aagaaaatat cctgaaaggt gtgcgagatt ccagctattc cttggaaagt tccctagagc 780
ttttacagaa ggatgtggta cagctccatg ctcctcgata tcagtctatg agaagggatg 840
taattggctg tactcaggag atggatttca ttctttggcc tcggaatgat attgaaaaaa 900
tcgtctgtct cctgttttct aggtggaaag aatctgatga gccttttagg cctgttcagg 960
ccaaatttga gtttcatcat ggtgactatg aaaaacagtt tctgcatgta ctgagccgca 1020
aggacaagac tggaatcgtt gtcaacaatc ctaaccagtc agtgtttctc ttcattgaca 1080
gacagcactt gcagactcca aaaaacaaag ctacaatctt caagttatgc agcatctgcc 1140
tctacctgcc acaggaacag ctcacccact gggncagttg gcaccataga ggatcacctc 1200
cgtccttata tgccagagta gagtactgac cagcaaaatg gagaagatca gagaatgcag 1260
cagcagtttt ttttcttgtt ttcttaccac tttattcttt cagagtttaa agaaaatgga 1320

ctcatgcaca gaacactatg cattttgaaa cttgttcatc ctggattttt ttaaatcatt 1380
tttatctcag aacttaaaca aaaattagat gtcgtgcacg gactgtgtga aagaagatgc 1440
tttgcatatt tgctgcactg catcagtatc ttactaaaaa tgtgaaatga aaggactatt 1500
gtacactgaa atgcttaaat gtatctgaaa gcacaaggtg atactcattt ttatggtctt 1560
cccatttgtg ctggtttttg cctctttgac atctgtcatc agtatttaga gggtgagaag 1620
tgaatgtaac aggtataaat aacattttta aaaacaataa ctttgctata atcacagttg 1680
ttccagagca ctgtcagata cattctaatg accagaactg gtttaaaaaa agaaaataca 1740
accatgggaa rgaaatctta aatgaaaaac gcatctcatt gtaggcattt ttgcctcata 1800
ttttactggg ccatgtttgt ttcctggtac tcatgtattt tttttttcca gatctctttc 1860
cccaagttgc tattgtaaga gtattctgct gcgtgtggat gcagttatac acattaaagc 1920
agatctggag tctgaagtag ctataaagca gctataaaac agaaatacat gcatagctgc 1980
agaaaccatg ataggtagag gacttttctt ttggttttgt tttgttttgt tttgttttgt 2040
ttttggtttt acagagaaga gatttttatt acaaagaaaa aaattccagt gaattgtgca 2100
gaaatgctgg tttttacacc atcctaaaga aaaactttac aagggtgttt tggagtagaa 2160
aaaaggttat aaagttggaa tcttaaattg taaaattaac cattgagtgt caaagttcta 2220
aaagcagaac tcattttgtg caatgracat aaggraagac tactgtatag gtttttkttt 2280
tctcctttta aatgaaraaa arcttgctta agggttgcat acttttattg gagtaaatct 2340
gaatgatcct actcccttgg a 2361

<210> 60
<211> 1472
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (129)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (130)
<223> n equals a,t,g, or c

<400> 60
aattcggcac gagcccagat ggcgctggag gaccaggccg ccacactgga gtataagacc 60
atcaaggaac atctcagcag caagagtccc aaccatgggg tgaaccttgt ggagaacctg 120
gacagcctnn cccccaaagt tccacagcgg gaggcctccc tgggtccccc gggagcctcc 180
ctgtctcaga ccggtctaag caagcggctg gaaatgcacc actcctcttc ctacggggtt 240
gactataaga ggagctaccc cacgaactcg ctcacgagaa gccaccaggc accactctca 300
aaagaaacaa cactaactcc tccaattcct ctcacctctc cagaaaccag agctttggca 360
ggggagacaa cccgccgccc gccccgcaga gggtggactc catccaggtg cacagctccc 420
agccatctgg ccaggccgtg actgtctcga ggcagcccag cctcaacgcc tacaactcac 480
tgacaaggtc ggggctgaag cgtacgccct cgctaaagcc ggacgtaccc cccaaaccat 540
cctttgctcc cctttccaca tccatgaagc ccaatgatgc gtgtacataa tcccaggggg 600
agggggtcag gtgtcgaacc agcaggcaag gcgaggtgcc cgctcagctc agcaaggttc 660
tcaactgcct cgagtaccca ccagaccaag aargcctgcg gcagagccga ggacgctggg 720
tcctcctctc tgggacacag ggtactcac gaaaactggg ccgcgtggtt tggtgaaggt 780
ttgcaacggc ggggactcac cttcattctc ttccttcact ttcccccaca ccctacaaca 840
ggtcggaccc acaaaagact tcagttatca tcacaaacat gagccaaaag cacataccta 900
ccccatcccc cacccccmca cacacacaca catgcacaca acacatacac acacacgcac 960

agaggtgaac agaaactgaa acattttgtc cacaacttca cgggacgtgg ccagactggg 1020
tttgcgttcc aacctgcaaa acacaaatac atttttaaa atcaagaaaa tttaaaaaga 1080
caaaaaaaaa agaattcatt gataattcta actcagactt taacaatggc agaagtttac 1140
tatgcgcaaa tactgtgaaa tgcccgccag tgttacagct ttctgttgca gcagataaat 1200
gccatgttgg gcaactatgt catagatttc tgctcctcct ctcttttaat gaaataacgt 1260
gaccgttaac gcaagtaact ctttatttat tgttcaccct ttttttcctt aaggaaagga 1320
ctcttccaaa tatcatccta tgaacagctc ttcagaaagc ccattgaaag ttaaactatt 1380
taacgtgaaa tccattaact ggaataattg agtttcttta tttttacaat aaattcactg 1440
agtaaataaa aaaaaaaaaa aaaaaaaaaa aa 1472

<210> 61
<211> 1672
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (884)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1583)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1645)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1663)
<223> n equals a,t,g, or c

<400> 61
ccagcctcca ggcacccggg atccagcgcc gccgctcata acacccgcga ccccgcagct 60
aagcgcagct cccgacgcaa tggacccggc gctggcagcc cagatgagcg aggctgtggc 120
cgagaagatg ctccagtacc ggcgggacac agcaggctgg aagatttgcc gggaaggcaa 180
tggagtttca gtttcctgga ggccatctgt ggagtttcca gggaacctgt accgaggaga 240
aggcattgta tatgggacac tagaggaggt gtgggactgt gtgaagccag ctgttggagg 300
cctacgagtg aagtgggatg agaatgtgac cggttttgaa attatccaaa gcatcactga 360
caccctgtgt gtaagcagaa cctccactcc ctccgctgcc atgaagctca tttctcccag 420
agattttgtg gacttggtgc tagtcaagag atatgaggat gggaccatca gttccaacgc 480
cacccatgtg gagcatccgt tatgtccccc gaagccaggt tttgtgagag gatttaacca 540
tccttgtggt tgcttctgtg aacctcttcc aggggaaccc accaagacca acctggtcac 600
attcttccat accgacctca gcggttacct cccacagaac gtggtggact ccttcttccc 660
ccgcagcatg acccggtttt atgccaacct tcagaaagca gtgaagcaat tccatgagta 720
atgctatcgt tacttcttgg caaagaactc ccgtgactca tcgaggagct ccagctgttg 780
ggacaccaag gagcctggga gcacgcagag gcctgtgttc actctttgga acaagctgat 840
ggactgcgca tctctgagaa tgccaaccag aggcggcagc ccanccccttc ctgcctcctg 900

ccccactcag ggttggcgtg tgatgagcca ttcatgtgtt ccaaactcca tctgcctgtt 960
acccaaacac gcctctcctg gcagggtaga cccaggcctc taaccatctg acagagactc 1020
ggcctggaca ccatgcgatg cactctggca ccaaggcttt atgtgcccat cactctcaga 1080
gaccacgttt ccctgactgt catagagaat catcatcgcc actgaaaacc aggccctgtt 1140
gcctttaag catgtaccgc tccctcagtc ctgtgctgca gccccccaaa tatattttc 1200
tgatatagac cttgtatatg gctttaatgc cgcaaaatat ttattttcc ttaaaaaagg 1260
tgtcaacttg gaaataatgg tttaaaaaca ggataagcat taaggaaaaa cactttcaat 1320
gtgtcttcca tttgatgaat ttgtkttkct ctctttatcc ccgcaagtgg agtttcatgt 1380
cctcggtgaa accagacagt gtgaatctgt tccagcccaa atctgcagca ttagggatga 1440
gttctcrgaa gtgattctga actgagcacg cactcatgtc tgcatgggga actctgggga 1500
gaagagcctt cctttcttt cccttgggcc atttgccttt ccttgtcgtc ttactgaggg 1560
cggaggcagg gagggtctct gtnctttcca gggccctggg cagggccatc ctggccattc 1620
agggaaagat gggaagagtt agggnctccg ttttaggcag ccntgggtgg ga 1672

<210> 62
<211> 1540
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1265)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1468)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1507)
<223> n equals a,t,g, or c

<400> 62
gcggacggtg ggtcgaccca cgcgtccgct actaacaact taccacagtg cggagactgc 60
tttctgaaaa ggccactcac gtgaacacta gggatgaaga tgagtrtacc cctcttcatc 120
gagcagccta cagtggacac ttagatattg ttcaggagct cattgcacag gggccgatg 180
ttcatgcagt gactgtggat ggctggacgc ccctgcacag tgcttgtaag tggaataata 240
ccagagtggc ttctttctta ctgcagcatg atgcagatat caatgcccaa acaaaaggcc 300
tcttgacccc cttgcatctt gctgctggga acagagacag caaggatacc ctagaactcc 360
tcctgatgaa ccgttacgtc aaaccagggc tgaaaaacaa cttggaagaa actgcatttg 420
atattgccag gaggacaagt atctatcact acctctttga aattgtggaa ggctgtacaa 480
attcttcacc tcagtcttaa caattctagt aattttccta agtttctaaa taccagtgcc 540
tcctgtgtgt gagatgtatt cccataatca aagttgacgt caaacatctt actacaaaaa 600
ttcagtgaca ttcattataa cattcttcca agtgaattgc ctgactttra tgtcaaaatg 660
tatttgaaag taatttgcat atatctttaa ttatttctgt ggagtttgtg atttttttat 720
cagaaataat tttaatgtgt gtatacttaa aaacttgaca cgggttgtac agaaactggt 780
atttttggtg ctgatacaag agaaatgtat ttttaaatat cccacatcct ggatctttgt 840
tgggtattta gtatattgac atatattttt ataaggtgag gtaactcaga acttaattta 900
aaagtcttaa atattctgat acaattcagc tgtcttctct accttaccat agccagttgc 960

tttcatttta aaccagagca agtaacatat tagtgacttg aatcttcata agttaaagta 1020
aaaaacagca aaaaacctag atctttgtct tttagaacac agaccatttt caggaaagca 1080
gttagctaag tgtttaattc atgaatattg tatactgcat cccctaccac aatttacaca 1140
atcctgtgga tagtcctacc tcaccctggt caacctacat gatccttaag ctaatggcga 1200
atcacgatga ccttgtagac atgcacacaa ctataccttt gtccaacaga tcataatata 1260
tctgnctatc caactggttt tacctgccta atcctactga tttgggcact gcttgtatar 1320
tctctcaagt tcacaggaaa tgttgatttt ctaaggtcct catttttaca gagtatacag 1380
gcaaagtgac aggggaaaag gaattagtct aagagtaagg ggatgattat tatrttgagg 1440
staaaaccac aaagtggctc aggctttnaa aaaaaaacac tgtggataat gacaaaaagc 1500
ataagtnaaa atatttgaga aaaataaagt acaagaaatg 1540

<210> 63
<211> 1044
<212> DNA
<213> Homo sapiens

<400> 63
aacaccttca tccatgaaga tatctggaac attcgtagta tctgcagcac caccaatatc 60
caatgcaaga acggcaagat gaactgccat gagggtgtag tgaaggtcac agattgcagg 120
gacacaggaa gttccagggc acccaactgc agatatcggg ccatagcgag cactagacgt 180
gttgtcattg cctgtgaggg taacccacag gtgcctgtgc actttgacgg ttagatgcca 240
ccatgtaggg attatcgcga gtggttgacc ttacacttac tccttaaata gcagtgagta 300
atgcatttga gctgtcccag gctctgtctc ctcagctcat ttcctactct ttttctctat 360
ataactcatt ctattaaata cattgcacca aagagatatg gagacataaa cctgtaatga 420
atgaggctgg gcttttctgt aataagcttc cttttataat actggtcagc ttagctctct 480
cagatcctat cctgtggaat ttagttatta tgtgtattta tgtagtattt caaacatttc 540
aaaatgcttt catctatgtt tatcacattt taataccaca gcacttataa tgatgtcact 600
acatatagaa gctcaaagtt aagggatttg ctgaagactg taaagttaat ggaagaattg 660
agacaaaaat ccagtgtagc tggccactta tccagggctt tttctacttc atcacaagga 720
atgttttgaa agtgtctgct ttttttatcc ttaaattca cctgtcaggg aggcattaaa 780
aatttggaaa tgtatgccag caaaatgtga gctctgtatt ttttggcatt cttatgtttg 840
ggtttaataa gattaagaaa atgatactgg gaattttctt tttcctgaaa ctttgaatca 900
ccctagtaag tcaaagtact aaaaaatgta ctagatcatt aagacttatg tgctcttact 960
gattgaaaga ttttttatgt tttccttgta ataaaggacc taaaccgaag gtacctgaaa 1020
aaaaaaaaaa aaaaaaaact cgag 1044

<210> 64
<211> 851
<212> DNA
<213> Homo sapiens

<400> 64
cacgagagaa ggtggttatt tatacaaaca tggacatact cactcccaag ggctgatgag 60
atgctgaatt ttctttgggg gcattcatta attgtcccag ctgcagcgac tggagcaagt 120
ctggaagctg cctgtgctaa gaccacccag ctgtccctgg gttctcatcc tagggccttc 180
tttgcttcca ggtcagggga cctgcttcaa tgagaaagca actgaattga ggctaggaga 240
ggtagggaga gctgagttct gacttcacct gtgcagaact ctctgccccc atgttacctg 300
gactggaaca gactgtgaat atagcagaag gttccaagaa ctctggtgtc tgacctagaa 360
gaggcacagt tctctctact ggaaagaaaa cgatgtagcc gattgcacaa gggtgccaag 420
ggaagaccca ggatggccca tcaaaggaac ctgggggagg atgcaggagg ctgaagggat 480
gcacctggca tttctctcac tgtgctctta ccgcatcagc aaccccccaac ttttgggcct 540

actctgcccc ccatgcgtga ataccctgct tggatgctgt gcttttccgg tttgtctcta 600
agccccttc tccagggcat gttggtttcc ctggcctctc agtgtcctaa ctggagccca 660
gagtgccttg ttctgagcca ggagacggct gagcactggc cctccacacc taagcgtcct 720
ttacattaac ttattggtct tgtataacac ctggtgccat tgccaagtgg ctgtgtcctc 780
agctacagag ctggaattgt gtggggttta gtgctaaata cttcaataaa gtctgttttt 840
tgtgattggc t 851

<210> 65
<211> 2793
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2793)
<223> n equals a,t,g, or c

<400> 65
ccacgcgtcc ggattacatg tagttattga gaatcctttc gaattcagtg gcttaatcat 60
gaatgtctaa atattgttga cattaggatg atacatgtaa attaaagtta catttgttta 120
gcatagacaa gcttaacatt gtagatgttt ctcttcaaaa atcatcttaa acatttgcat 180
ttggaattgt gttaaataga atgtgtgaaa cactgtatta gtaaacttca tcacctttct 240
acttccttat agtttgaact tttcagtttt tgtagttccc aaacagttgc tcaatttaga 300
gcaaattaat ttaacacctg ccaaaaaaag gctgctgttg gcttatcagt tgtctttaaa 360
ttcaaatgct catgtgactt ttatcacatc aaaaaatatt tcattaatga ttcaccttta 420
gctctgaaaa ttaccgcgtt tagtaattat agtgggctta taaaaacatg caactctttt 480
tgatagttat ttgagaattt tggtgaaaaa tatttagctg agggcagtat agaacttata 540
aaccaatata ttgatatttt taaaacattt ttacatataa gtaaactgcc atctttgagc 600
ataactacat ttaaaaataa agctgcatat ttttaaatca agtgtttaac aagaatttat 660
atttttatt ttttaaaatt aaaaataatt tatatttcct ctgttgcatg aggattctca 720
tctgtgctta taatggttag agattttatt tgtgtggaat gaagtgaggc ttgtagtcat 780
ggttctagtg tttcagtttg ccaagtctgt ttactgcagt gaaattcatc aaatgtttca 840
gtgtggtttt ctgtagccta tcatttactg gctatttttt tatgtacacc tttaggattt 900
tctgcctact ctatccagtt gtccaaatga tatcctacat tttacaaatg ccctttcagt 960
ttctattttc tttttccatt aaattgccct catgtcctaa tgtgcagttt gtaagtgtgt 1020
gtgtgtgtgt ctgtgtgtgt gtgaatttga ttttcaagag tgctagactt ccaatttgag 1080
agattaaata atttaattca ggcaaacatt tttcattgga atttcacagt tcattgtaat 1140
gaaaatgtta atcctggatg acctttgaca tacagtaatg aatcttggat attaatgaat 1200
ttgttagtag catcttgatg tgtgttttaa tgagttattt tcaaagttgt gcattaaacc 1260
aaagttggca tactggaagt gtttatatca agttccattt ggctactgat ggacaaaaaa 1320
tagaaatgcc ttcctatgga gagtattttt cctttaaaaa attaaaaagg ttaattattt 1380
tgaaaaaaaa aaatcgaccc acgcgtccgg attacatgta gttattgaga atcctttcga 1440
attcagtggc ttaatcatga atgtctaaat attgttgaca ttaggatgat acatgtaaat 1500
taaagttaca tttgtttagc atagacaagc ttaacattgt agatgtttct cttcaaaaat 1560
catcttaaac atttgcattt ggaattgtgt taaatagaat gtgtgaaaca ctgtattagt 1620
aaacttcatc acctttctac ttccttatag tttgaacttt tcagtttttg tagttcccaa 1680
acagttgctc aatttagagc aaattaattt aacacctgcc aaaaaaaggc tgctgttggc 1740
ttatcagttg tctttaaatt caaatgctca tgtgactttt atcacatcaa aaaatatttc 1800
attaatgatt cacctttagc tctgaaaatt accgcgttta gtaattatag tgggcttata 1860
aaaacatgca actcttttg atagttattt gagaattttg gtgaaaaata tttagctgag 1920
ggcagtatag aacttataaa ccaatatatt gatattttta aaacattttt acatataagt 1980

aaactgccat ctttgagcat aactacattt aaaaataaag ctgcatattt ttaaatcaag 2040
tgtttaacaa gaatttatat tttttatttt ttaaaattaa aaataattta tatttcctct 2100
gttgcatgag gattctcatc tgtgcttata atggttagag attttatttg tgtggaatga 2160
agtgaggctt gtagtcatgg ttctagtgtt tcagtttgcc aagtctgttt actgcagtga 2220
aattcatcaa atgtttcagt gtgstyttct gtagyctatc atttactggc tattttttta 2280
tgtacacctt taggattttc tgcctactct atccagttgt ccaaatgata tcctacattt 2340
tacaaatgcc ctttcagttt ctattttctt tttccattaa attgccctca tgtcctaatg 2400
tgcagtttgt aagtgtgtgt gtgtgtgtct gtgtgtgtgt gaatttgatt ttcaagagtg 2460
ctagacttcc aatttgagag attaaataat ttaattcagg caaacatttt tcattggaat 2520
ttcacagttc attgtaatga aaatgttaat cctggatgac ctttgacata cagtaatgaa 2580
tcttggatat taatgaattt gttagtagca tcttgatgtg tgttttaatg agttattttc 2640
aaagttgtgc attaaaccaa agttggcata ctggaagtgt ttatatcaag ttccatttgg 2700
ctactgatgg acaaaaaata gaaatgcctt cctatggaga gtatttttcc tttaaaaaat 2760
taaaaaggtt aattattttg aaaaaaaaaa acn 2793

<210> 66
<211> 303
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (108)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (278)
<223> n equals a,t,g, or c

<400> 66
agattaagca tacttaacca ctccttattt gtagattcac tttcaacctt aaaaattaat 60
accagtttgc ataaaccaat atctgaaaag aacaggaaat gttaatgnca agcaacagct 120
attaatactg atgtgaatgg atgcatttgt tttgcagtgg tgactggcct aggcaggttt 180
gggatctgtg aaagaattga ttcattttca aaattattcc ataaagttaa aaagttacac 240
tttaaaggca acaggtcata cagttcttta aaatctgnat ccaactgtag ctttatttaa 300
aag 303

<210> 67
<211> 1410
<212> DNA
<213> Homo sapiens

<400> 67
ccacgcgtcc ggtccctagg agataagagt atcttgcaca gcaggtgcag gtttcccagc 60
agctcaggca agagtccgat gtttgtgcca tctgatcctg atgtctggag agatagccat 120
gtgtgagcct gaatttggca atgacaaggc cagggagccg agcgtgggtg gcaggtggcg 180
agtgtcctgg tacgaacggt ttgtgcagcc atgtctggtc gaactgctgg gctctgctct 240
cttcatcttc atcgggtgcc tgtcggtcat tgagaatggg acggacactg ggctgctgca 300
gccggccctg gcccacgggc tggctttggg gctcgtgatt gccacgctgg ggaatatcag 360
tggtggacac ttcaaccctg cggtgtccct ggcagccatg ctgatcggag gcctcaacct 420

```
ggtgatgctc ctcccgtact gggtctcaca gctgctcggg gggatgctcg gggctgcctt 480
ggccaaggcg gtgagtcctg aggagaggtt ctggaatgca tctggggcgg cctttgtgac 540
agtccaggag caggggcagg tggcaggggc gttggtggca gagatcatcc tgacgacgct 600
gctggccctg gctgtatgca tgggtgccat caatgagaag acaaagggcc ctctggcccc 660
gttctccatc ggctttgccg tcaccgtgga tatcctggct gggggccctg tgtctggagg 720
ctgcatgaat cccgcccgtg cttttggacc tgcggtggtg gccaaccact ggaacttcca 780
ctggatctac tggctgggcc cactcctggc tggcctgctt gttggactgc tcattaggtg 840
cttcattgga gatgggaaga cccgcctcat cctgaaggct cagtgaagca gagctcgtgg 900
gattcctgct gctccaggtg tcctcagctc acctgtccca gactgaggac aggggagttc 960
ctgcatttcc tgccagggca gaggcccaga ggagcgaccc cctgcttcca ctgcttgggc 1020
ctgctttctc agatagactg actgctgagg aggctctagg ttcttggaat tcctttgtgc 1080
tcatcagaga ccccagcctg gggaacacgc tgcccgcact gcccagagag cagtgcaaac 1140
accacaacac gagcgtgttt cttgagagga atgtccccga gttggacaag gaggctgttt 1200
ctgcacatca gctcatttcc cgcaccccat ttcttgcttg attgctttgt tggggggcctg 1260
gccacttcct tgcttctcaa gctgacaatt ctcactttgc aataaatagt ccagtgtttc 1320
cttccaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1380
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa                                 1410
```

<210> 68
<211> 1024
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<400> 68

```
angggangga agggaaggga agggaagggg gggtcacgcg ggggcgcgcg cgcgcaccgg 60
gagccgctcg raggcgagtg gaactggatc gggtttgctg ccagcggcgt gagcttcggc 120
cgccatttta caacagctcc actcgcgccg gacacaggga gcagcgagca cgcgtttccc 180
gcaacccgat accatcggac aggatttctc cgcctcagcc caacggggag atctctggaa 240
acatggctac agaacatgtt aatggaaatg gtactgaaga gcccatggat actacttctg 300
cagttatcca ttcagaaaat tttcagacat tgcttgatgc tggtttacca cagaaagttg 360
ctgaaaaact agatgaaatt tacgttgcag ggctagttgc acatagtgat ttagatgaaa 420
gagctattga agctttaaaa gaattcaatg aagacggtgc attggcagtt cttcaacagt 480
ttaaagacag tgatctctct catgttcaga acaaaagtgc ctttttatgt ggagtcatga 540
agacttacag gcagagagaa aaacaaggga ccaaagtagc agattctagt aaaggaccag 600
atgaggcaaa aattaaggca ctcttggaaa gaacaggctc acacttgatg tgaccactgg 660
acagaggaag tatggaggac cacctccaga ttccgtttat tcaggtcagc agccttctgt 720
tggcactgag atatttgtgg gaaagatccc aagagatcta tttgaggatg aacttgttcc 780
attatttgag aaagcataag gttctcagag tgatagagct ggaaggatca taaaggtcat 840
ctagtctaat ggttctcaaa ctcgaaggaa cattagggtc atcctggaga gtttactggg 900
ccccgtctca gaggttctga tgctgtaaat caggcgggac ccctgaattt tcatttctaa 960
gaagctcaca ggtgctacta atgttgaaga gaacctatga tctagttcaa cttctgggat 1020
```

tctt 1024

<210> 69
<211> 1848
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1761)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1844)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1847)
<223> n equals a,t,g, or c

<400> 69
agactcggat ggtagtccgc tgtccaacag ccarccttcc ttcccagtgg agatcttgcc 60
cttcctctac ttgggctgtg ccaaagactc caccaacttg gacgtgttgg aggaattcgg 120
catcaagtac atcttgaacg tcacccccaa tttgccgaat ctctttgaga acgcaggaga 180
gtttaaatac aagcaaatcc ccatctcgga tcactggagc caaaacctgt cccagttttt 240
ccctgaggcc atttctttca tagatgaagc ccggggcaag aactgtggtg tcttggtaca 300
ttgcttggct ggcattagcc gctcagtcac tgtgactgtg gcttacctta tgcagaagct 360
caatctgtcg atgaacgatg cctatgacat tgtcaaaatg aaaaaatcca acatatcccc 420
taacttcaac ttcatgggtc agctgctgga cttcgagagg acgctgggac tcagcagccc 480
atgtgacaac agggttccag cacagcagct gtattttacc accccttcca accagaatgt 540
ataccaggtg gactctctgc aatctacgtg aaagacccca cacccctcct tgctggaatg 600
tgtctggccc ttcagcagtt tctcttggca gcatcagctg ggctgctttc tttgtgtgtg 660
gccccaggtg tcaaaatgac accagctgtc tgtactagac aaggttacca agtgcggaat 720
tggttaatac taacagagag atttgctcca ttctctttgg aataacagga catgctgtat 780
agatacaggc agtaggtttg ctctgtaccc atgtgtacag cctacccatg cagggactgg 840
gattcgagga cttccaggcg catagggtag aaccaaatga tagggtagga gcatgtgttc 900
tttagggcct tgtaaggctg tttcctttg catctggaac tgactatata attgtcttca 960
atgaagacta attcaatttt gcatatagag gagccaaaga gagatttcag ctctgtattt 1020
gtggtatcag tttggaaaaa aaaatctgat actccatttg attattgtaa atatttgatc 1080
ttgaatcact tgacagtgtt tgtttgaatt gtgtttgttt tttcctttga tggcttaaa 1140
agaaattatc caaagggaga aagagcagta tgccacttct taaaacagaa caaaacaaaa 1200
aaagaaaatt gtgctctttt ctaatccaaa gggtatattt gcagcatgct tgactttacc 1260
aattctgatg acatctttac ggacactatt atcactaaga ccttgttatg gcgaagtctt 1320
tagtcttttt catgtatttt cctcatgatt ttttctcttt atgtagtttg actatgcctt 1380
acctttgtaa atatttttgc ttgtgttgtc gcaaagggga taatctggga aagacaccaa 1440
atcatgggct cactttaaaa aaagaaagaa taaaaaaacc ttcagctgtg ctaaacagta 1500
tattacctct gtataaaatt cttcagggag tgtcacctca aatgcaatac tttgggttgg 1560
tttctttcct ttaaaaaaat ttgtataaaa ctggaagtgt gtgtgtgtga gcatgggtac 1620
ccatttgata agagaaatgc atttgattgt gaagaaggga gagttaaatt ctccattatg 1680

ttcgtggtgt aaagtttwga gctggaattt attataagaa tgtaaaacct taaattatta 1740
ataaataact attttggcta naaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1800
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaggg gggnccnc 1848

<210> 70
<211> 2682
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (647)
<223> n equals a,t,g, or c

<400> 70
gaatacccca ggatttatgt ataaaaacct gcagtgtctg gttattgatg aagctgatcg 60
tatctttgat gtggggtttg aagaggaatt aaagcaaatt attaaacttt tgccaacacg 120
tagacagact atgctctttt ctgccaccca aactcgaaaa gttgaagacc tggcaaggat 180
ttctctgaaa aaggagccat tgtatgttgg cgttgatgat gataaagcga atgcaacagt 240
ggatggtctt gaacagaaga accgaaagaa gaagcttatg gtcttctttt catcttgtat 300
gtctgtgaaa taccactatg agttgctgaa ctacattgat ttgcccgtct tggccattca 360
tggaaagcaa aagcaaaata agcgtacaac cacattcttc cagttctgca atgcagattc 420
gggaacacta ttgtgtacgg atgtggcagc gagaggacta gacattcctg aagtcgactg 480
gattgttcag tatgaccctc cggatgaccc taaggaatat attcatcgtg tgggtagaac 540
agccagaggc ytaaatggga gagggcatgc cttgctcatt ttgcgcccag aagaattggg 600
ttttcttcgt tacttgaaac aatccaaggt tccattaagt gaatttngac ttttcctggt 660
ctaaaatttc tgacattcag tctcagcttg agaaattgat tgaaaagaat tactttcttc 720
ataagtcagc ccaggaagca tataagtcat acatacgagc ctatgattcc cattctctga 780
aacagatctt taatgttaat aacctaaatt tgcctcaggt tgctctgtca tttggtttca 840
aggtgcctcc cttcgttgat ctgaacgtca acagtaatga aggcaagcag aaaaagcgag 900
gaggtggtgg tggatttggc taccagaaaa ccaagaaagt tgagaaatcc aaaatcttta 960
aacacattag caagaaatca tctgacagca ggcagttctc tcactgaaca catgccttcc 1020
tttcatcttg aataactttg tcctaaaatg aatttttttt ccccttgatt taacaggatt 1080
tttgtagact ttagaatttg gacttaccta acaagagtat aaattgactt gggttgcaag 1140
cactgagcac tgttacttct atcacgtctc tcttttattt ctgggatata aaacaggctt 1200
taagtttctt ggttgcccaa gggcagagca aggaatatct ggtgtttctt gtgatgataa 1260
tattttaatt ttaaatatcc ctccctcata caagtgtatg ttaccatttt aatataattc 1320
tttttgtacc tttccttctt gttttgtgaa gatttttgtg gcatggattg ctgtgctcac 1380
tgctgtaaaa ggtgacctag tgtactgggc agctggtggc ggtgcagaaa agagtctcag 1440
gttatttttt gtttttagtt atttcttgga ccttgacagt atctaatgac tcctcctgaa 1500
aatgctgcag tataaaagag caaagagctt tgggaaatac ctaagaagca ccttaagatt 1560
agggtggcat tgcttttata gattcttgat tttaaagcaa caggcctttc tcaggtgttg 1620
catttttttgg agcaaaaact atgggttgta atttgaataa agtgtcacta agcagttata 1680
acgtttgatg gctgggggt aggaagagga tggaattgag atgtttgagc ctcatttaca 1740
tcaatagagg tgtaatgtac tgcatttctt catttggtaa cataacaaag actttcatac 1800
aaagaacgat gatgctcctc attaagattt gtttaattca aggtggtttg gatttggtaa 1860
gcctttgcac tctgtagagt acttagaaga caagggcaac ttacttggag ttagagccaa 1920
gctgtcagac ggtgcccagc acacattaat gttagcttct ttctgagaaa aaaatacctc 1980
ttccaggccc tgaaacaaaa aatacatttg ctgtgaagat tgaaaatgaa caaagttaga 2040
aaaaaaaaca gcaaaatcag tgatttagtc agatgagttt ttcgttgtag gagcacttga 2100
tttctagtgt gttttgtaca gtatataact acaagatagt acatttgta gcagttcaaa 2160

gccaaagttg ctagcatcat tttgctgttg tgccagttaa tcataggatc ccattaaata 2220
agtgtgctaa catcgaatat agagaaaact ggtaaagaac attccagtag gaaaagaaaa 2280
gaacaatctt ccatttctgg gcttggccac catcaccctg gtcggacctg tcctggactt 2340
ccaaccttga ctgctgagct cctggcttag cttcttgggt tcctaattcc tggtgtttaa 2400
taattctctc cacgatcatg tttttctgat ttttttttc agaaataatg tttttaaaa 2460
gacaaaaaca aagggaagaa tatttaatta ctgagcagaa gtaaatactg ttggtatttt 2520
gtacataatc taatttttat atgcatgtty atgcttttta attttttat caaaaattaa 2580
gtcatctacc tactacttgt aaccagcttg tttcataaca tgttattttc ctgtgtcatt 2640
aaataattac ttcaatgttg aaaaaaaaaa aaaaaaaaaa aa 2682

<210> 71
<211> 412
<212> DNA
<213> Homo sapiens

<400> 71
ggcagagcca acagacaccc tccactctga ggtctcacct tcgcctttgc tgaagtctcc 60
ccgcagccct ctccacccag aggtctccct ataccgagac ccaccatssw wccatcctga 120
ggaccgcccc aaccctcgga gcccccсact cagtaggtct gaaggcctcc atttgtaccg 180
aaacaccccg ctcacgctga cagcctccta ggytccctga ggtacctttc cacccagacc 240
ctccttcccc accccataag ccctgagact cccgcctttr acctgacgat cttccccctt 300
cccgccttca ggttcctcct aggcgctcag aggccgctct gggggttgc ctcgagtccc 360
cccacccctc cccacccacc accgctcccg cggcaagcca gcccgtgcag aa 412

<210> 72
<211> 1361
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (46)
<223> n equals a,t,g, or c

<400> 72
taagaacttt tgtccttccc ttcttgaggt cctttttga ttgtgncttt agtatcaagt 60
tcagcagttg tttcaagagc agctgagata atwaattcaa ccaaatggcg ccttggttct 120
ttawggtatc tgawactcct ctaggacttg cgagggccgt gtcctgagta gtgtgtgmcc 180
cttggctcac gttgcctctg ttttcctcaa gttgccagac ttagaagmct tgatgaaaag 240
ggagaaccag aagattctga ctcccctggt gagcctggac accccaggga aagcaacagt 300
acaggtggtc attctggccg accctgacgg acatgaaatt tgctttgtcg ggatgaagc 360
atttcgagaa ctttctaaga tggatccaga gggaagcaaa ttgttggatg atgcaatggc 420
agcagataaa agtgacgagt ggtttgccaa acacaataaa cccaaagctt caggttaacg 480
gaagacatga tgcagagcaa gcctctgtga ttcctgccca gcacctgtga ggcctgacgt 540
gtcagttccc aataaatgct cttctgattt gtttcccgta caggcaagga ggcttgggta 600
gtgcagattt gtgtatttca atctttgaaa gctctgatgt aatttagaaa tgaaatccaa 660
tcatgagtcc aggtagagaa cgcctgctgt aatctacact gttgctggga ctgcgcattc 720
tgtatataac tgtgttggat gagtgacaga tgattgtcca gactaggaca gcggcatgaa 780
catgactttg gttgggattg cggatagtta gggttacctc tgaatcgtgt agcttttatg 840
agagcagctg tgcaagtgaa tccacattaa tgccttgtcg tggtgccatt cccagcgcct 900
gacgatacgc tcttctattg tcttattctg gcaggttttg acgttttaaa ttttttaaag 960

aaattttatt ccttggacca aaaggtttgg ttaaccaccc ccctcttact tgctttcaca 1020
ttttgagtgt ccagaggaaa cagaaaggaa tgagtgtgtg acgttgctgc acgcctgact 1080
ctgtgcgagc ttctttctgt gtatatattt tgttttattt ttttccgtgt atatttttaa 1140
tcccgacaga acatcatgtg agatttcttt aaaatggatt aaacgatttc ttcagcctga 1200
aaaaaaaggt tttgaaaatg ttttcttgta gttttgtttg gttctaaaca acaaataggt 1260
tttaatcact cgaaatggaa ttatattgtg tattcattga ataaattttt tttgaaagta 1320
agcttctgaa atcaaaaaaa aaaaaaaaaa aaaaaaaaaa a 1361

<210> 73
<211> 928
<212> DNA
<213> Homo sapiens

<400> 73
cagcaatggc agcatctgcc ttgatatcct gcggtctcag tggtctccag cgttgactgt 60
gtcaaaagtt ctcttgtcca tctgctcgct gctctgcgac cccaaccccg atgaccccct 120
ggtgccagag atagcacaca cctacaaggc cgacagagag aagtacaaca gactagcaag 180
agagtggaca caaaaatatg ctatgtaagt gccttggagg ttttacatga gacactgtcc 240
aagagaagct ggcagagagg tcttccctta aaactttggg ctgttggctg agccattcaa 300
agagcatcat ctgttcttca aacaaatgtt ggtcacccac tctctccagc tgcagcatgt 360
tggtgccatt ttcagcaatt acggctttga cagtgccacc tctttgatgc caaatcagca 420
accattgttg ttatgatctg cagtcttcct ggtgacactg gaatctctct ctctgccgcc 480
tcagtttgtc tgctggtctc ttgggggggcc aggcctgcac gtctctccta cccggcctca 540
aatggtgctg ctgcccatga tggtaccaca ccagggcctc agcctggccc ctcaccacat 600
accctttgcc ttttagaact cagtgccatc ctgggtgccc agggcagarc aggctttgtt 660
cgcacctcat ctgctgcaga accacatcct gaggagtctc agcttatcct ggagggaatt 720
gggaacagtg tcactgggaa gtgaaggcct agccctgtgg cttccaccag tctcctcctg 780
cagtgccacg tggtgaattt tctcgccttc acaccaagaa agcagcaaag tggaaaattt 840
tcaaggatac aaaggcacat aacamcccca taagragatg attaaggttt tttagaagca 900
agagcaaaat tttgaaaacc tctaggag 928

<210> 74
<211> 1186
<212> DNA
<213> Homo sapiens

<400> 74
gcggacgcgt gggcagcccg ggcggctgcc cttgggtgct cccttccctg cccgacaccc 60
agaccgacct tgaccgccca cctggcagga gcaggacagg acggccggac gcggccatgg 120
ccgagctccc ggggcccttt ctctgcgggg ccctgctagg cttcctgtgc ctgagtgggc 180
tggccgtgga ggtgaaggta cccacagagc cgctgagcac gcccctgggg aagacagccg 240
agctgacctg cacctacagc acgtcggtgg gagacagctt cgccctggag tggagctttg 300
tgcagcctgg gaaacccatc tctgagtccc atccaatcct gtacttcacc aatggccatc 360
tgtatccaac tggttctaag tcaaagcggg tcagcctgct tcagaacccc cccacagtgg 420
gggtggccac actgaaactg actgacgtcc accccctcaga tactggaacc tacctctgcc 480
aagtcaacaa cccaccagat ttctacacca atgggttggg gctaatcaac cttactgtgc 540
tggttccccc cagtaatccc ttatgcagtc agagtggaca aacctctgtg ggaggctcta 600
ctgcactgag atgcagctct tccgaggggg ctcctaagcc agtgtacaac tgggtgcgtc 660
ttggaacttt tcctacacct tctcctggca gcatggttca agatgaggtg tctggccagc 720
tcattctcac caacctctcc ctgacctcct cgggcaccta ccgctgtgtg gccaccaacc 780
agatgggcag tgcatcctgt gagctgaccc tstctgtgac cgaaccctcc caaggccgag 840

tggccggagc tctgattggg gtgctcctgg gcgtgctgtt gctgtcagtt gctgcgttct 900
gcctggtcag gttccagaaa gagaggggga agaagcccaa ggagacatat gggggtagtg 960
accttcggga ggatgccatc gctcctggga tctctgagca cacttgtatg agggctgatt 1020
ctagcaaggg gttcctggaa agaccctcgt ctgccagcac cgtgacgacc accaagtcca 1080
agctccctat ggtcgtgtga cttctcccga tccctgaggg cggtgagggg gaatatcaat 1140
aattaaagtc tgtgggtacc aaaaaaaaaa aaaaaaaagt cgacgc 1186

<210> 75
<211> 933
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (791)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (794)
<223> n equals a,t,g, or c

<400> 75
gtctggatca tattgtagat aaagtaaaag aatgtgtgga tcatttaagt agagatgagg 60
atgaagagaa actggtagcc tcactatggg gagcagagag atgtttacga gttttagaaa 120
gtgtaactgt gcataatccc gaaaatcaaa gctacttgat agcatataaa gattcccaac 180
ttattgtttc atcagctaaa gcattacagc attgtgaaga actgattcag cagtacaacc 240
gtgctgagga cagcatatgc ttagctgaca gtaagcctct gcctcaccag aatgtaacta 300
accatgtagg caaagcagtg gaggactgca tgagggccat catcggggtg ttgcttaatt 360
taactaatga taatgagtgg ggcagcacca aaacaggaga gcaggacggt ctcataggca 420
cagcgctgaa ctgtgtgctt caggttccaa agtacctacc tcaggagcag agatttgata 480
ttcgagtgct gggcttaggt ctgctgataa atctagtgga gtatagtgct cggaatcggc 540
actgtcttgt caacatggaa acatcgtgct cttttgattc ttccatctgt agtggagaag 600
gggatgatag tttaaggata ggtggacaag ttcatgctgt ccagctttag tgcagctatt 660
ccttgagcga gagcgggcag cccagctagc agaaagtaaa acagatgagt tgatcaaaga 720
tgctcccacc actcagcatg ataagagtgg agagtggcaa gaaacaagtg gagaaataca 780
gtgggtgtca ntgnaaaaga ctgatggtac agaagagaaa cataagaagg aggaggagga 840
tgaagaactt gacctccaat aaaggtatat ttactttgaa tggtgtattt aaattgaaga 900
tagtggtttg attttgtttt tttcctccaa acc 933

<210> 76
<211> 1964
<212> DNA
<213> Homo sapiens

<400> 76
ggtttggcag ggcggggcgc ctcgcgaaga tggtggcgcg cgtggcgtgt ggctcccgtc 60
gtctggccaa gtctcagcgc agcgcaccgg ccggcgtctc gttggcctgg agcccacacc 120
caccgggtcc ctgaccccgc gccccccgcg cccggttccc ggcatgcctc gcgcccgtaa 180
gggcaacacg ctccggaagg gtggtcagcg ccgtggagga ggtgcccgga gcagtgccca 240
agctgactcg ggttccagtg acgatgaggc agccagtgag gcccgcagca ccgccagtga 300

atgccccagc cttctcagca ccactgcaga ggacagcctt ggggggggatg tcgtggatga 360
gcagggccag caggaagacc ttgaggaaaa gctgaaggag tatgtggact gtctcacaga 420
caagagtgcc aagacccggc aggtgctctt gagagcctgc gcctggccct agcgtcccgc 480
ctactccccg acttcttgct ggagcgccgc ctcacgctag ccgatgccct ggaaaagtgc 540
ctcaagaaag ggaagggcga ggaacaagcc ctggctgctg ctgtgctagg cctgctctgc 600
gtgcagctgg gccctggacc taagggtgag gagctgtttc acagcctgca gcctctgctg 660
gtctctgtgc tcagtgacag cacagctagc cctgctgccc ggctccactg tgcttctgcc 720
cttggcctgg gctgctacgt ggctgccgct gacatccagg acctggtctc ttgccttgcc 780
tgcttagaaa gtgttttcag ccggttctat ggcttggggg gcagctccac aagtcctgtg 840
gttcctgcca gcctgcacgg cctgctctct gctgccctgc aggcctgggc attgctgctc 900
accatctgcc ctagcaccca aatcagccac atccttgaca ggcagctgcc ccggctgccc 960
cagctcttgt ccagtgaaag tgtgaacctg cggatcgctg ccggtgaaac cattgcactg 1020
ctctttgagc ttgcccggga ccttgaggag gagtttgttt acgaggacat ggaggccctc 1080
tgcagtgtcc tgcgcactct ggccactgac agtaacaagt accgtgccaa ggctgatcgt 1140
cggcgccagc gctctacttt ccgcgccgtg ctgcactccg tggagggcgg tgaatgcgaa 1200
gaagagatag tgcgcttcgg ctttgaggtg ctctacatgg acagctgggc tcggcaccgg 1260
atctacgctg ccttcaagga agtgctgggt tcgggcatgc accaccacct ccagaacaat 1320
gagctactcc gtgacatctt tggcctgggc cctgtgctgt tgctggatgc cactgccctg 1380
aaggcctgca aggttccacg ctttgagaag cacctgtaca atgctgctgc cttcaaagcc 1440
cggaccaagg ctcgaagccg tgtgcgggac aagcgggcag acatcctgtg aagcaggacc 1500
tgctgaagag gagactttct atgcccttgg tccgtatttt taacagaaga cagtgcaaca 1560
actggtctcc accagtattt gtcactttat ttttttaat gacaaaacca aaaacagaca 1620
tggggtgggt agctgggggc ccggacactt gggaccctga cccctttgtc cctgcactca 1680
gccctgtggc cccttcctgt cctgtctcag gccaggctaa atatgtgcct tcctcagggc 1740
tgtggggcag gcactagggg gcctttccct tcctttcctt tctcaggcct tgctccccca 1800
ggatgaccca ctcttagggg ggtggtggca tctggacaaa tgccaccaca gcaggtgggg 1860
tggcaaagct acctggaatg gatttgtgtg ctgattttta aggattatta cagataatta 1920
aacagaacgg tcagccttca aaaaaaaaa aaaaaaaaa aaaa 1964

<210> 77
<211> 1802
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1680)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1747)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1757)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (1800)
<223> n equals a,t,g, or c

<400> 77
acgcgtccgc ttccatctgc tctggaatta aatatgcatt tcaggtgatt ggagagctac 60
attcccaact cgatggatcc gaagtactgc tgctgactga tggggaggat aacactgcaa 120
gttcttgtat tgatgaagtg aaacaaagtg gggccattgt tcattttatt gctttgggaa 180
gagctgctga tgaagcagta atagagatga gcaagataac aggaggaagt catttttatg 240
tttcagatga agctcagaac aatggcctca ttgatgcttt tggggctytt acatcaggaa 300
atactgatct ctccsagaag tcccttcagc tcgaaagtaa gggattaaca ctgaatagta 360
atgcctggat gaacgacact gtcataattg atagtacagt gggaaaggac acgttctttc 420
tcatcacatg gaacagtctg cctcccagta tttctctytg ggatcccagt ggaacaataa 480
tggaaaattt cacagtggat gcaacttcca aaatggccta tctyagtatt ccaggaactg 540
saaaggtggg cacttgggca tacaatctty aagccaaagc gamcccagaa acmttaacta 600
ttacagtwac ttctcgagca kcaaaattct tctgtgcctc caatcacagt gaatgctaaa 660
atgaataagg acgtaaacag tttccccagc ccaatgattg tttacgcaga aattctacaa 720
ggatatgtac ctgttcttgg agccaatgtg actgctttca ttgaatcaca gaatggacat 780
acagaagttt tggaactttt ggataatggt gcaggcgctg attctttcaa gaatgatgga 840
gtctactcca ggtattttac agcatataca gaaaatggca gatatagctt aaaagttcgg 900
gctcatggag gagcaaacac tgccaggcta aaattacggc ctccactgaa tagagccgcg 960
tacataccag gctgggtagt gaacggggaa attgaagcaa acccgccaag acctgaaatt 1020
gatgaggata ctcagaccac cttggaggat ttcagccgaa cagcatccgg aggtkcattt 1080
gtggtatcac aagtcccaag ccttccttgc ctgaccaata cccaccaagt caaatcacag 1140
accttgatgc cacagttcat gaggataaga ttattcttac atggacagca ccaggagata 1200
attttgatgt tggaaaagtt caacgktata tyataagaat aagtgcaagt attcttgatc 1260
taagagacag ttttgatgat gctcttcaag taaatactac tgatctgtca ccaaaggagg 1320
ccaactccaa ggaaagcttt gcatttaaac cagaaaatat ctcagaagaa aatgcaaccc 1380
acatatttat tgccattaaa agtatagata aaagcaattt gacatcaaaa gtatccaaca 1440
ttgcacaagt aactttgytt atccctcaag caaatcctga tgacattgat cctactccta 1500
ctcctactcc tactcctgat aaaagtcata attctggagt taatatttct acgctggtat 1560
tgtctgtgat tgggtctgtt gkaattgkta actttatttt aagtaccacc atttgaacct 1620
taacgaagaa aaaaatcttc aagtagacct agaagagagt tttaaaaaac aaaacaatgn 1680
aagtaaagga tatttctgaa tcttaaaatt catcccatgt gtgatcataa actcataaaa 1740
ataattntaa gatgtcngga aaaggatact ttgattaaaa taaaaacact catggatatn 1800
ta 1802

<210> 78
<211> 995
<212> DNA
<213> Homo sapiens

<400> 78
cggggtgcct ggggcagacg aggccggctt ctccgcggac agctagggag agtgtcctgg 60
gtgtcagcca gaacatgtct ttcaacctgc aatcatcaaa gaaactgttc attttcttag 120
gaaaatcact gtttagtctt ctggaggcta tgatttttgc cttactccca aagccacgga 180
agaacgttgc tggtgaaata gtcctcatca caggtgctgg aagtggactc ggaaggctct 240
tagccttgca gtttgcccgg ctgggatctg ttcttgttct ctgggatatc aataaggagg 300
ggaatgagga aacatgtaag atggctcggg aagctggagc cacaagagtg cacgcctata 360
cctgcgattg cagccaaaag gaaggagtgt atagagtasc cgaccaggtt aaaaaagaag 420
tcggcgatgt ttccatccta atcaacaatg ccggaatcgt aacaggcaaa aagttccttg 480
actgtccaga tgagcttatg gaaaagtcat ttgatgtgaa tttcaaagca catttatgga 540

cttataaagc ctttctacct gctatgattg ctaatgacca tggacatttg gtttgcattt 600
caagttcagc tggattaagt ggagtaaatg ggctggcaga ttactgtgca agtaaatttg 660
cagcctttgg gtttgctgaa tctgtatttg tagaaacatt tgtccaaaaa caaaagggga 720
tcaaaaccac gattgtgtgc ccctttttta taaaaactgg aatgtktgaa ggttgtacta 780
caggctgtcc ttctctgttg ccaattctgg aaccaaaata tgcagttgaa aaaatagtag 840
aagctattct acaagaaaaa atgtacttgt atatgccaaa gttgttatac ttcatgatgt 900
ttcttaaaag gtaattacat cagcttctat tacttcccta acatgccagt ctacagttta 960
ctccaaatcc cmccaggaaa aaccactttt aaaaa 995

<210> 79
<211> 1215
<212> DNA
<213> Homo sapiens

<400> 79
gcaggaccgt cattgacgcc atgagcgcgc tgctgcggct gctgcgcacg ggtgccccag 60
ccgctgcgtg cctgcggttg gggaccagtg cagggaccgg gtcgcgccgt gctatggccc 120
tgtaccacac tgaggagcgc ggccagccct gctcgcagaa ttaccgcctc ttctttaaga 180
atgtaactgg tcactacatt tccccctttc atgatattcc tctgaaggtg aactctaaag 240
aggaaaatgg cattcctatg aagaaagcac gaaatgatga atatgagaat ctgtttaata 300
tgattgtaga aatacctcgg tggacaaatg ctaaaatgga gattgccacc aaggagccaa 360
tgaatcccat taaacaatat gtaaaggatg gaaagctacg ctatgtggcg aatatcttcc 420
cttacaaggg ttatatatgg aattatggta ccctccctca gacttgggaa gatccccatg 480
aaaaagataa gagcacgaac tgctttggag ataatgatcc tattgatgtt tgcgaaatag 540
gctcaaagat tctttcttgt ggagaagtta ttcatgtgaa gatccttgga attttggctc 600
ttattgatga aggtgaaaca gattggaaat taattgctat caatgcgaat gatcctgaag 660
cctcaaagtt tcatgatatt gatgatgtta agaagttcaa accgggttac ctggaagcta 720
ctcttaattg gtttagatta tataaggtac cagatggaaa accagaaaac cagtttgctt 780
ttaatggaga attcaaaaac aaggcttttg ctcttgaagt tattaaatcc actcatcaat 840
gttggaaagc attgcttatg aagaagtgta atggaggagc tataaattgc acaaacgtgc 900
agatatctga tagccctttc cgttgcactc aagaggaagc aagatcatta gttgaatcgg 960
tatcatcttc accaaataaa gaaagtaatg aagaagagca agtgtggcac ttccttggca 1020
agtgattgaa acatctgaaa ttctgctgtc aagattccca tctctaagga ctccaagtgc 1080
tagagacaag gggtctatg agcatttact gacttcctgt taaaacttca ttttttcaaa 1140
ctttttgagc tatgcaatat ataaataaac agtaagaatt ttaaattaaa aaaaaaaaaa 1200
agggcggccg ctcta 1215

<210> 80
<211> 2660
<212> DNA
<213> Homo sapiens

<400> 80
gcagacttga ttagcctgcc taccactgta gagggacttc agaagagtgt agcttccatt 60
ggcaatactt taaacagcgt ccatcttgct gtggaagcac tacagaaaac tgtggatgaa 120
cacaagaaaa cgatggaatt actgcagagt gatatgaatc agcacttctt gaaggagact 180
cctggaagca accagatcat tccgtcacct tcagccacat cagaacttga caataaaacc 240
cacagtgaga atttgaaaca ggatatcctg taccttcaca actctttaga ggaggtaaac 300
agtgccctag tggggtacca gagacagaat gatcttaaac tcgagggaat gaacgagaca 360
gtcagtaatc ttacccagag agtcaacctg atagaaagcg atgtggttgc tatgagcaag 420
gtagaaaaga aagcaaacct gtccttcagc atgatgggtg atagatctgc cactctgaaa 480

agacagtctt tggwtcaagt caccaacaga acagatacag taaaaatcca aagcataaag 540
aaagaagata gttcaaattc tcaggtatcc aagctaagag agaaactcca gctgatcagt 600
gctcttacaa acaaacctga gagcaacmgg cctccagaga ccgccgatga agagcaagta 660
gagagtttca catcaaagcc atcagcattg ccaaaatttt cacagtttct tggagaccca 720
gttgagaaag ctgcccaact aagacctatc tccctaccag gagtttctag cactgaagat 780
cttcaggatt tattccgcaa gactggccag gacgtggatg ggaagctgac ctaccaggaa 840
atctggacct ccctaggttc tgctatgcca gaaccagaga gcttgagagc atttgattcc 900
gatggagatg gaagatactc attcctggag ctaagggtag ctttaggtat ctagcttcat 960
caggcatatt ttagaaatgg actgcctaat atctatttac ctaacaacaa aacaaccctt 1020
acttacccat cagtcctcta gtcctccaaa ctactgtagc agatactttg ccacctttta 1080
acttgtttga agaagctata taaaagttat ttttttaaag aagaagacca ttttacttat 1140
gatgttcaga aatctatgat ttcctacaac cagtaagatc ttacatttta aaattgccag 1200
aaaaaaaatt aaagccctct ttttttctct ttcctttttt tgaggggagg agaccttatc 1260
ttttaaagct gggaaatgta tatagagaga gaataagcca cttttatatt tcacttaaat 1320
ttgccttaaa ttagctgcac tttatagaga ctcagaaaat gtcttttctt taaaagatag 1380
gccttttctg tttgtaaata tttaaatgaa agaaagcatt gtgcatattg tgtggaaagt 1440
aggaagaatg gttttgaaca ggatatgaac aaatgactta ttaaaaattg ctgatctggt 1500
gtaggtggca gctgaaacta catccatgtc tccataaggy atccctcaaa ggcccaggcg 1560
ctgccagggg gtttgtcctg gtagctggag gaaccgattt cagggagtag acactggaga 1620
caatactgac tccaggcatg gctcatggaa gtaggattct ggttctttgt tcctattccc 1680
tcagctaatc ccaacctggg aatcagagaa gtcttgggga tttttctcat ttttagtact 1740
atttcagggt ttatgagcat aaaaagttat ccattgggga gctccatttt ccctgctgag 1800
tgagctagat tgccttcccc acccacccac ttaagtctgt cttaaagccg tagctggctc 1860
ccaccaccag taccatctcc atttgaatgg cagggctaaa ttcccccagc cattatctca 1920
cactgaccac ccagagcttt agaagagagc tgtgcttcta attttgaccc agaaaaccat 1980
accccttgag attttaccta gaggctaacc aagagcctaa tatgtttctc tggggatgga 2040
ctaaagccaa aaaggctgtg agatgaaaca tgtgaaataa tattcagttt ccttaccatt 2100
accagctcag aagtagctag aggctttcta cccaaaggat gccaaagtat agcagggcag 2160
gcctggagct agggccttca catggtggta gcaagttttt caaatctaat acaatcaagt 2220
acaatacttc ctttaaatgc ttctgtggac ctggcatgaa agatccctag attgaaagga 2280
ataatacctc catgtctcct gtatgttgag tctagaattg ctgtgttgtt cttagaagca 2340
gtctttgggc aacaacttga aaggggaaaa aaaaactaca aaaacttaac tttggtatag 2400
gccaagtcag ggagaaagta gagaaagctg tcatgccaca gacttcttta gtggagatca 2460
tttccttttt aactttgttc aggttgccct tcaccatgga tacagtccgg taccctttaaa 2520
catttaaggg ctgttttttt tttctttaca tgatgttcag cttggtatta accaaactta 2580
aatttttttt ccagaagtat taaaatttag ttaaagcaaa aaaaaaaaaa aaaaaaaaaa 2640
aaaaaaaaaa gggcggccgc 2660

<210> 81
<211> 1790
<212> DNA
<213> Homo sapiens

<400> 81
ccttgcccta tctgaccaca ctatttaatg tttttatctt aaatttaaaa aactgaaatc 60
tgaaactgta tgatagtcag taggcctaaa actccccctt gactttgaga atttgaaggg 120
attcccttcc atcctgaagt ctactttctt gtcatttaag ggtgagagaa gggaagcttc 180
tgtgcctttc tagaaattaa caaagaacct gttgggtcct agaccagaaa tccagcacgt 240
tatcctagca tgaaactccc ttttaaaaag tgaacaccca aagagatgtt acaaatgaag 300
atatagcccc ttcagcatct ctggagacca ataccacaat aaggaataat aacaacctag 360
gaataaaggc aggagttttt acataggatg cacgatatcc aaagggactt tataaacaca 420

agccattgag tcttaagacc tgacacatgg caaggrtagg acatgtgaga gaaaatggat 480
ggacggttga agaaaagagg ggaaaagacc atgcagttga actaacttct ttttaatttc 540
aaacaggtat tttttgcatc cgtgcgatct ggaggaagta gccaagtgtt tttcatgacc 600
ctcaacagaa attccatgat gaactggtaa cagaagagca cttggcactt atcttcatgg 660
cgttatttct aatttaaaag aacataactc atgtggactt atgccagtct agaggcagaa 720
tcagaaggct tggttgaaca tatcgctttc ccttttttcct ctccctccgc ccctcccagt 780
acagtccatc tttcaatgtt gcagcctggt tgagaaggag agaaaaaggt ggcaggaatt 840
tccaggagat ccccaagaat gctgccttgt ctgtggacaa agatggacca tgtgcccttc 900
ggaattaggg atagaaacaa atattgtgtg ctcttaacga ttaagctgtg ttatggtggg 960
ttttcaggtt tttacctttt ttctttaccc ctttactctg caagaatggg gaaagaatgc 1020
atactgcgaa aatgagtctt ttaaattctg tctgcctact agttttaagt atatggtatg 1080
ttgtaaaatt tccaatgatg agagacagca caataaatgt accttatctc cttaggctga 1140
aggccataac tacatagtgg agtaatttaa gaactctctt gccttcacca acccaaaagg 1200
ttgctttttg atagcaactg gctaatgaat ttttaaaaga gaagaaaaat actagtttttc 1260
ccctcttttg ggaaatagat tttaaatggc taaactacta gccttaaaac tactagtcta 1320
ataaaatcaa ctaccacttt tgtgaatctg acaggccaca tttttatatg gccctttaca 1380
gaatggagtg tgttgaacag gatactaacg ccattgagtt gagctggcct agcgatggag 1440
ggacactcta acacaacttt ccctcagcta ttatgcaaca gatcagggaa aaagatggga 1500
tgacagatgg ggtcagacag aaagagcttc tgggaaacaa gcttacatag tctttttttaa 1560
aatgcacaaa gcctcccagc taagaggtca cttggtttgg gcttcattag gactgagact 1620
ttgttgagtt ctttctggga cttggagagt ggatgatatt caggctctga acattcccag 1680
cgctctcccg agggtgccac tttctcaaga tgaaaactgt gactgaaaaa attaataata 1740
aatgtttctg agctgcaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1790

<210> 82
<211> 1350
<212> DNA
<213> Homo sapiens

<400> 82
agtgggcggg ccatttcttg ttctctctcc cgctctcgga agctttcgtc tcgtgggtgc 60
gaaaggtaac cgaagcggct caggaaggca gctgtcactg agcccctgga acagagcgag 120
agtatcgtaa gtaaccaggc tcagccggtt tctcaggccg ctctagtcaa ataaaccata 180
aagatcagac tcgggcttct tcacttcctt ctctccgtgg tttcgccatt agcttccggt 240
tccggggagg ggccgagttt tcttcgaaga tttggggctc cgcgatacag ttaggatggc 300
tgtagtacct ctgctgttgt tggggggttt gtggagcgct gtgggagcgt ccagcctggg 360
tgtcgttact tgcggctccg tggtgaagct actcaatacg cgccacaacg tccgactgca 420
ctcacacgac gtgcgctatg ggtcaggtag tgggcagcag tcagtgacag gtgtaacctc 480
tgtggatgac agcaacagtt actggaggat acgggggaag agtgccacag tgtgtgagag 540
gggaaccccc atcaagtgtg gccagcccat ccggctgaca catgtcaaca ctggccgaaa 600
cctccatagt caccacttca cttcacctct ttctggaaac caggaagtga gtgcttttgg 660
tgaggaaggt gaaggtgatt atctggatga ctggacagtg ctctgtaatg gaccctactg 720
ggtgagagat ggtgaggtgc ggttcaaaca ctcttccact gaggtactgc tgtctgtcac 780
aggagaacaa tatggtcgac ctatcagtgg gcaaaaagag gtgcatggca tggcccagcc 840
aagtcagaac aactactgga aagccatgga aggcatcttc atgaagccca gtgagttgtt 900
gaaggcagaa gcccaccatg cagagctgtg aatctagagg ctctgagcca ctgttaacgc 960
acaatgttca cagacatctg ttgctgcctc accttgggat ccctgccaca agttccttgg 1020
gcagtggcca tgtcaccatt gagatgaaga tatacaacag aaaatagtgg ctgtgtttgg 1080
aagcttcagc cctgcacatt tgaactagtc actctcccag acttgcgtgg gtcagttctt 1140
tctgagtaga ggacttgctg gtaaaggggc agatgctttt tattagtact gataaaacaa 1200
actgagggaa acatccctct tagctgggaa actttactc ttcaggagct tggcatcatg 1260

gactgttaat gtatgtgatt ttccccctat tttctctctc caaaatgata aaaacaataa 1320
ttttaaaaaa aaaaaaaaaa aaactcgagg 1350

<210> 83
<211> 1746
<212> DNA
<213> Homo sapiens

<400> 83
ggcatcagta aggtctgtat ttaaatgtgg atgtagacat cataattacc aagacaagaa 60
attgttttga gaaattctct gatgtttttc ttcttcaggt ttcacgtgcc acgatcatgg 120
tgccacggta ctgcagtatg cacccaaaca gcaactccta atctcggggg gtaggaaaag 180
acacgtctgc atttttgaca tcargcaaag gcagctcatt cacacgttcc aggcccatga 240
ctcagctatt aaggctctgg ccttggatcc ctatgaggaa tattttacca caggttcagc 300
agaaggtaac ataaaggttt ggagattgac aggccatggc ctaattcatt catttaaaag 360
tgaacatgct aagcagtcca tatttcgaaa cattggggct ggagtcatgc agattgacat 420
catccagggc aatcggctct tctcctgtgg tgcagatggc acgctgaaaa ccagggtttt 480
gcccaatgct tttaacatcc ctaacagaat tcttgacatt ctataaagat tggggtttta 540
tttttatata catttcagtt aaaaggcaca ctacagtcat cactaggcaa ttctgctttc 600
taagcagttg tattgaaaac agagaatctc tgtgtagaat ttgaatatga cccaagctga 660
gtattatcta aacaggttgg tggaatgaat gcgcatgtac cttattatgc tgacatacta 720
aaaaaaataa aacctagtat tgtatgaagg atagctattc tttacagcat ttagcaaacc 780
tgattcagaa aacatttgag attagcaaat tagtaacttg aaataatgaa aaggacgttt 840
ataccaaatt aaggaagaaa atgttgctga tttgggtttt tcttcctgtt cttaccactg 900
actgaagcat gcctgcagtc tcctcctctg ttgaatgaag gataatcata aggtgtttgt 960
taggagcgct agaccacctg gaaaactttc ttagctgtgg agcagtgcgc agtgaccagt 1020
tctctgctgt gagaggccgt ttccattctt tcctgctgaa tatttttcct gttagtgttt 1080
atactgagct agtactgtaa cttgcaaatg agtgcaaatt taaatgcaat gttttactca 1140
caatttgcac attcacattt tttggactgc tagtttttct atttaaatat ttgccttcat 1200
gttaggaatg tactatgtga acatgacata tttgtagtta accaaacaca ccttcttagt 1260
ccagtttagt actttttctt ttcgtgtatt caaggttaaa cacccaaaca tttaaggata 1320
tgttgaaact acaccaatag agcatttcat atcataatta aaatgaatgt taggcttctt 1380
gtggccagtt aatagttgat gagattggtg acattattta ttgccacagc ctattgtata 1440
aactatgcag agttaaatat ttgcttgtaa aatattagcc aatgttgtca ttattttgat 1500
gtatttcctt ggttatgacc aaaaatatgt tgagatactg aaactaatgt ctgtgtgttt 1560
aaatgtttac cagcaaattg tcttatcatg ttaatgagaa tgttcaatgc ctgtgtggta 1620
aatagtaaat acaatggcat aaaagtaact ttctctgaag atgtgatgtt caggctgtga 1680
aatatatatg taaaagaaaa ataaatgtta tttgttagaa aaaaaaaaaa aaaaaaaaaa 1740
ctcgta 1746

<210> 84
<211> 1491
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (176)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (711)
<223> n equals a,t,g, or c

<400> 84
cccacgcgtc cgaatcaaca aagaatctga agtttacaag atgcttcagg agaaacagga 60
gttgaatgaa cccctgaaac agtctacctc tttcctgatt ttgcaggaaa tcctggagtc 120
tgagataaaa ggggatctca acaaccctca ggattcagaa gtgttaaaac tcctgnaccc 180
traagtgrmt gcatcaattg gaaatgctca gaaggtgccc atgtgtgaca aatgtggtcc 240
tggcattgta ggcatgtttg taaagctgcg ggaccatca tcccctccct gaatgttacg 300
tgtgcactga ttgtgacamt cacccgaaag agaagggctt tttttttttt tttccatcaa 360
atctactgtg aagagcatgc ccaggagcaa gtcacaccac ttgagggtac gatgtgatca 420
tcatgttccc caagtgatcc agcagacctg cactgaccac cgttctccag ccagcctctg 480
ctgcagctag ttctctaaat gttctggcct tgtctcttga aagttctgta cttattcccc 540
caccccccaa cccgcttacc ttggttttat ccctgctcat tgaaccttga gtcccttgtc 600
ttggttaact gactcacact gactgtgtgg tgcccgccca cttttacaat gaatggcaaa 660
ctgtttttgt tcagtgtccc cttgccggca acactgtgta ccttcctccc ntcagttctt 720
ctctgctgca aatggacatc agccacattt gaaccaaatc aaatataata tgtctgacat 780
tgatttcatt tttgctccat ctatagactc ccagaaaaaa raaawaaaaa aaatgcaaag 840
aaaatttaaa tgaacaaaca gacccttctg gaacctactg tgacatgaga tgtgtccaca 900
aggcgaggtt tcaggcacac actgaaggag catctgctgg acagccctcc ccgcccccaa 960
gtccttacca acctgtgcca ctgcataccc tgtaaaaagt gtgtggtggt tggtaatgga 1020
ggagttttga agaataagac attrggrgaa aaaatcgacy cctatgatgt aataataaga 1080
atgaataatg gtcctgtttt aggacatgaa gaagaagttg ggagaaggac aaccttccga 1140
ctttttatc cagaatctgt tttttccaga tccctattca caatgaccct aatacgacag 1200
tgattcctca ctgcttttaa gccacatgat ttaaggtggc tgttggaatt gttgatgggt 1260
gacaaaataa acactaatgg tttttggaag aaaccagcct taaacctgat ttataaacct 1320
tatcaaatcc gaatattaga tcctttcatt atcagaacag cagcttatga actgcttcat 1380
tttccaaaag tgtttcccaa aaatcagaaa cctaaacacc caacaacagg aattattgcc 1440
atttttacat aacctctatg attttaataa aaaaaattat gtaaaaaaaa a 1491

<210> 85
<211> 968
<212> DNA
<213> Homo sapiens

<400> 85
ctgcagttaa gtgaaaagaa aatccagcct ccccctccaa aaaaaaaaaa aaaaaaaaaa 60
atttaatttt taaaaattag tggtatggca ataagacact tcagaggcta tcttaacctc 120
tgaataccca tcttctagtt taaagacaga gacatcccat ctggaaaatg ttaacttgtg 180
ttgccatctc gttgccggag taagtagaca taagacagag tttaagaagt aaaaatatag 240
aaaaattttg atggtcacaa tgagataaat attagaatat tactattcca atgattaaat 300
gaggatcttg aaataaattc tgaagtcttc caatttttac atttattgga ggggtccctg 360
agttctgtca actttttat ttaagtctct tgctcttatt ttgtgcataa atgttaaacc 420
ttccaaaaat gaaatgttag ctttctttct tttacttttt attaaattta atagaaaata 480
tgacctgagt agttaaaaag tattttgcat tatttgcagt aagatgtctc tagcactgct 540
caaagggcaa atttaaaac ttcagtctgg gtgaaagatt tgctagtttt acagaaagat 600
ttgctatctt aaactcaagc tggtttttct gttctcatgt aagtgactgg gatgctgtct 660
tatgaattct tccaaggtca tgtttgtgaa ataaacatta catgagagct ttcctgtcat 720
ctacactata tgttgtctgg agtgttgaac aaatttattt tagtttctaa gttgtaatct 780
atcctcatat ggtctatacg attttgaatg tgtgccacta catactgaga tgataatgct 840

gtacaatttt aagtggtagc agtttctgta tgcagtaggc tgaaatattt tgatgaactg 900
cttaattttt ggattttatt ttttaagttg tataatttat tttcttgcaa aataaaaatg 960
taatataa 968

<210> 86
<211> 3068
<212> DNA
<213> Homo sapiens

<400> 86
cgacagaagg ggaggttgtt tttataagag gcgtcattgg cgcccgagct gtgaccgccg 60
ccactggggc agccagcaca atcgggcgga ggtggcgctg ccccttcaga cctgaaagat 120
gtctgaaaat tccagtgaca gtgattcatc ttgtggttgg actgtcatca gtcatgaggg 180
gtcagatata gaaatgttga attctgtgac cccccactgac agctgtgagc ccgcccccaga 240
atgttcatct ttagagcaag aggagcttca agcattgcag atagagcaag gagaaagcag 300
ccaaaatggc acagtgctta tggaagaaac tgcttatcca gctttggagg aaaccagctc 360
aacaattgag gcagaggaac aaaagatacc cgaagacagt atctatattg gaactgccag 420
tgatgattct gatattgtta ccccttgagcc acctaagtta gaagaaattg gaaatcaaga 480
agttgtcatt gttgaagaag cacagagttc agaagacttt aacatgggct cttcctctag 540
cagccagtat actttctgtc agccagaaac tgtattttca tctcagccta gtgacgatga 600
atcaagtagt gatgaaacca gtaatcagcc cagtcctgcc tttagacgac gccgtgctag 660
gaagaagacc gtttctgctt cagaatctga agaccggcta gttgctgaac aagaaactga 720
accttctaag gagttgagta aacgtcagtt cagtagtggt ctcaataagt gtgttatact 780
tgctttggtg attgcaatca gcatgggatt tggccatttc tatggcacaa ttcagattca 840
gaagcgtcaa cagttagtca gaaagataca tgaagatgaa ttgaatgata tgaaggatta 900
tctttcccag tgtcaacagg aacaagaatc ttttatagat tataagtcat tgaaagaaaa 960
tcttgcaagg tgttggacac ttactgaagc agagaagatg tcctttgaaa ctcagaaaac 1020
gaaccttgct acagaaaatc agtatttaag agtatccytg gagaaggaag aaaaagcctt 1080
atcctcatta caggaagagt taaacaaact aagagaacag attagaatat tggaagataa 1140
agggacaagt actgaattag ttaaagaaaa tcagaaactt aagcagcatt tggaagagga 1200
aaagcagaaa aaacacagct ttcttagtca aagggagact ctgttgacag aagcaaagat 1260
gctaaagaga gaactggaga gagaacgact agtaactacg gctttaaggg gggaactcca 1320
gcagttaagt ggtagtcagt tacatggcaa gtcagattct cccaatgtat atactgaaaa 1380
aaaggaaata gcaatcttac gggaaagact cactgagctg gaacggaagc taaccttcga 1440
acagcagcgt tctgatttgt gggaaagatt gtatgttgag gcaaaagatc aaaatggaaa 1500
acaaggaaca gatggaaaaa agaaaggggg cagaggaagc cacagggcta aaaataagtc 1560
aaaggaaaca tttttgggtt cagttaagga aacatttgat gccatgaaga attctaccaa 1620
ggagtttgta aggcatcata aagagaaaat taagcaggct aaagaagctg tgaaggaaaa 1680
tctgaaaaaa ttctcagatt cagttaaatc cactttcaga cactttaaag ataccaccaa 1740
gaatatcttt gatgaaaagg gtaataaaag atttggtgct acaaaagaag cagctgaaaa 1800
accaagaaca gtttttagtg actatttaca tccacagtat aaggcaccta cagaaaacca 1860
tcataataga ggccctacta tgcmaaatga tggaaggaaa gaaaagccag ttcactttaa 1920
agaattcaga aaaaatacaa attcaaagaa atgcagtcct gggcatgatt gtagagaaaa 1980
ttctcattct ttcagaaagg cttgttctgg tgtatttgat tgtgctcaac aagagtccat 2040
gagccttttt aacacagtgg tgaatcctat aaggatggat gaatttagac agataattca 2100
aaggtacatg ttaaaagaac tggatacttt ttgtcactgg aacgaacttg atcagttcat 2160
caataagttt ttcctaaacg gtgtctttat acatgatcag aagctcttca ctgactttgt 2220
taatgatgtt aaagattatc ttagaaacat gaaggaatat gaagtagata atgatggagt 2280
atttgagaag ttggatgaat atatatatag acacttcttt ggtcacactt tttcccctcc 2340
atatggaccc aggtcggttt acataaaacc gtgtcattac agtagtttgt aacatttgta 2400
gattggatag catttttatg atttgatgag tttcttgtaa ggttaccgtt tctaagagtt 2460

gtgctttatg gccactgaga gaattcagaa taaattgaaa gatggagtct aaaaattatt 2520
agctgttaca aatggaacat ttcattataa cgtgatcact ttgacttgag caaatggttt 2580
aatttttatc ttaaaaatca gttaagaata tataaaatcc tactttggcc aagtttgttt 2640
cttttcatta tagtttatat gaaaagatca ccttaagtga aattattttc ctttaatctt 2700
ttatgtattt attcactttt ggaagctagg aatgagcaac acaaatttta ctctgaagtc 2760
agaagagctc atatataata attctaatgt cccacctatt ttcacttgtc cattccatgt 2820
accagcttag ttatgatact tagtcacata attatctttg ataaaggtag aggcacaaag 2880
aggcaaacta agcaagtcaa attctaatgt gtgtacttca taataatttt ttatccattt 2940
tcatctttat attctgtaac atgaaactta cctaatcttc aaatgttagc ttcatttttt 3000
acctttgaaa tacttaatct ttctgaataa atataatgtg tctataaaat aaaaaaaaaa 3060
aaaaaaaa 3068

<210> 87
<211> 2230
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2227)
<223> n equals a,t,g, or c

<400> 87
ggcacagccg tgctccgggt aagatggcag cggacggaca gtgctcgctc cccgcttcat 60
ggcggccggt gaccctcacc cacgtcgaat atcctgcagg tgatctctcy ggccacctcc 120
ttgcctacct gagcctcagc cctgtatttg tcatcgtcgg tttcgtgacc ctcatcatat 180
ttaagcggga gtgcacacga tctccttcct tgggggcctg gcactgaacg aggggggtcaa 240
ctggctgatc aaaaacgtca tccaggagcc acggccctgt ggaggccccc acacagcagt 300
gggcaccaag tacgggatgc cctccagcca ttcccagttt atgtggttct tctccgtcta 360
ttccttcctt ttcctgtatt taagaatgca ccaaacaaac aacgccaggt tcctggactt 420
gctgtggagg cacgtgctct ccctgggact cctcgctgtg gccttcctag tctcctacag 480
cagggtctac ctgctgtacc acacctggag ccaggtgctc tatggaggca tcgctggagg 540
cctcatggcc atcgcctggt tcatcttcac ccaggaggtc ctcaccccgc tgttccccag 600
gatagcagcc tggcctgtct ccgagttctt cctaatccga gacacaagcc tcattcccaa 660
cgtactctgg tttgagtaca cggtaacccg ggcagaagcc aggmacagac aacgcaagct 720
ggggacgaaa ctgcagtgac cagtgggtgt ggctgggtcc agcctccaga tctggcccgc 780
acgatgcctt gcaggatgga caggatgaca gacagggacg aagcagagac ctctacagac 840
ccaagtcacc aagtggagcc tttttttttc ttattttaat tttaatgaac aaggtggacc 900
aaagggctga accagcccct caaccaggac cctgggggc ctgctgcctg ggggccgtgg 960
ccagagaccc tcgctgtgct gctgccagcc cctggctggg gcagaaagtg ccctcggcat 1020
gggcacctgg gtgtggggtg gaggaggagg gctcgcgcct ctggtctcgg ggccaggaat 1080
tccaggtggc gtgagaagta cacactattt atttttggt tttktcagag gcaggcagga 1140
ttttggagct ggaagaatct gctctccggt ggctgccctg tgaacagagg gctcccggtc 1200
agcttcccag gcccttcgcc ctatgcccag aggcagactg cctctccctg ggccggggtg 1260
gcctgggtgc caggaggagg ggagcatacc ccacaccctc cctgccaccg ttgccgttcc 1320
agaacctcgg tcagtgtttc cctgtctggg ggcagggccc agagcgagca cgcgtctggc 1380
ggctgctgtc gttgtgttct accccgtact gacccaacac cacaagggct ttctctggtc 1440
ccctgtccct aagacaataa tcgctttctg acaaaggagc ctgcacattt gggtgagcag 1500
acccaagctg tttacagctc tttcttgtcc tgccatccag tagcagttag tcttcatccc 1560
cacgtgaaca aaatgggaag gagccgtgag gagaggagtg aggcaacagg cacccgaagt 1620
ccctcgtcct tccctctgtg tgctctgaat atgtccttgt ccttcctgac ccatctctga 1680

```
ccagctggga acctgcttgg ggtccccctc aaacctgtgt ctggggtgtg ggctcacaga 1740
tccctatcag cctggttcgt gggagggctc ttcctaaagg gacccccatc tctaagtcac 1800
tctgaaaggg agttgtggag aggagacgcc tccagactct cagaagtttt gaggactgaa 1860
ctgggtcact cgggatctgt gttcgaatcc tccccacccc tttctttgtg gagtttccta 1920
acctgctgct gaagcacaat gttttggtgc tttcttttct catttgttaa aggcagtgtc 1980
caaaagccat tccagatgcc aagaccaggg gcttatttct agggaaggta ggtcggtttc 2040
catgtttccc tcccgttatt tttatttttt actttttgcc tgagacaagc cgagtatgag 2100
gtggtttgat ttaagaaaaa tcaatgaaat tgtttactac tgttttaaaa taaaaccgta 2160
aactctgaaa aaaaaaaaaa aaaaaaaaaa aaaaactcga ggggggggcc ggtacccaat 2220
cgcatcncat                                                        2230
```

<210> 88
<211> 1163
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<400> 88

```
actgccccaa gctcaaggag atcaatttcc gtgggaacaa gctgagggac aagcgcctgg 60
agaagatggt cagcggctgc cagaccagat ccatcctgga gtacctgcgc gtcggaggcc 120
gtggtggcgg gaaagggcaa gggccgtgcg agggctcgna gaaggaagag agccggagaa 180
gaggagggag aggaagcaga ggcgggaagg tggtgatggg gargagcagg acgtgggaga 240
tgccggccgg ctgctgctca gggtcctgca cgtctctgaa aaccccgtac ctctgacagt 300
cagagtgagc cccgaggtcc gggatgtgcg gccctacatt gtgggggccg tggtgcgagg 360
catggacctg cagccaggga atgcactcaa gcgcttcctc acctcgcaga ccaagctcca 420
cgaagatctc tgtgagaaga ggacggctgc caccccttgcc acccacgagc tccgtgccgt 480
caaagggccc ctgctgtact gcgcccggcc ccccacaggac ctcaagattg tccccttggg 540
gcggaaagaa gccaaggcca aggagctggt gcggcagctg cagctggagg ccgaggagca 600
gaggaagcag aagaagcggc agagtgtgtc gggcctgcac agataccttc acttgctgga 660
tggaaatgaa aattacccgt gtcttgtgga tgcagacggt gatgtgattt ccttcccacc 720
aataaccaac agtgagaaga caaaggttaa gaaaacgact tctgatttgt ttttggaagt 780
aacaagtgcc accagtctgc agatttgcaa ggatgtcatg gatgccctca ttctgaaaat 840
ggcagaaatg aaaaagtaca ctttagaaaa taaagaggaa ggatcactct cagatactga 900
agccgatgca gtctctggac aacttccaga tcccacaacg aatcccagtg ctggaaagga 960
cgggccctcc cttctggtgg tggagcaggt ccgggtggtg gatctggaag ggagcctgaa 1020
ggtggtgtac ccgtccaagg ccgacctggc cactgcccct ccccacgtga ctgtcgtgcs 1080
ctgacsccag ggccgcctgt ccgcgtttgt ttggccggtt ttgcggaggt ttctatgcgg 1140
caatgctgaa ttatccgtta gat                                         1163
```

<210> 89
<211> 1939
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (20)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (33)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1609)
<223> n equals a,t,g, or c

<400> 89
agcaacctat agatcatgan aggcaacggt nanctgacag taccggtcgg aattcccggg 60
tcgacccacg cgtccrgcgg taaccgccac agctgccagc gacaggatgg agagcgactc 120
agactcagac aagagtagcg acaacagtgg cctgaagagg aagacgcctg cgctaaagat 180
gtcggtctcg aaacgagccc gaaaggcctc cagcgacctg gatcaggcca gcgtgtcccc 240
atccgaagag gagaactcgg aaagctcatc tgagtcggag aagaccagcg accaggactt 300
cacacctgag aagaaagcag cggtccgggc gccacggagg ggccctctgg ggggacggaa 360
aaaaaagaag gcgccgtcag cctccgactc cgactccaag gccgattcgg acggggccaa 420
gcctgagccg gtggccatgg cgcggtcggc gtcctcctcc tcctcttcct cctcctcctc 480
cgactccgat gtgtctgtga agaagcctcc gaggggcagg aagccagcgg agaagcctct 540
cccgaagccg cgagggcgga aaccgaagcc tgaacggcct ccgtccagct ccagcagtga 600
cagtgacagc gacgaggtgg accgcatcag tgagtggaag cggcgggacg aggcgcggag 660
gcgcgagctg gaggcccggc ggcggcgaga gcaggaggag gagctgcggc gcctgcggga 720
gcaggagaag gaggagaagg agcggaggcg cgagcgggcc gaccgcgggg aggctgagcg 780
gggcagcggc ggcagcagcg gggacgagct cagggaggac gatgagcccg tcaagaagcg 840
gggacgcaag ggccggggcc ggggtccccc gtcctcctct gactccgagc ccgaggccga 900
gctggagaga gaggccaaga aatcagcgaa gaagccgcag tcctcaagca cagagcccgc 960
caggaaacct ggccagaagg agaagagagt gcggcccgag gagaagcaac aagccaagcc 1020
cgtgaaggtg gagcggaccc ggaagcggtc cgagggcttc tcgatggaca ggaaggtaga 1080
gaagaagaaa gagccctccg tggaggagaa gctgcagaag ctgcacagtg agatcaagtt 1140
tgccctaaag gtcgacagcc cggacgtgaa gaggtgcctg aatgccctag aggagctggg 1200
aaccctgcag gtgacctctc agatcctcca gaagaacaca gacgtggtgg ccaccttgaa 1260
gaagattcgc cgttacaaag cgaacaagga cgtaatggag aaggcagcag aagtctatac 1320
ccggctcaag tcgcgggtcc tcggcccaaa gatcgaggcg gtgcagaaag tgaacaaggc 1380
tgggatggag aaggagaagg ccgaggagaa gctggccggg gargagctgg ccggggagga 1440
rgcccccag gagaaaggcg gargacaagc ccagcaccga tctctcagcc ccagtgaatg 1500
gcgaggccac atcacagaag ggggagagcg cagaggacaa ggagcacgag gagggtcggg 1560
actcggagga ggggccaagg tgtggctcct ctgaagacct gcacgacanc gtacgggagg 1620
gtcccgacct ggacaggcct gggagcgacc ggcaggagcg cgagagggca cggggggact 1680
cggaggccct ggacgaggag agctgagccg cgggcagcca ggcccagccc ccgcccgagc 1740
tcaggctgcc cctctccttc cccggctcgc aggagagcag agcagagaac tgtggggaac 1800
gctgtgctgt ttgtatttgt tcccttgggt tttttttcc tgcctaattt ctgtgatttc 1860
caaccaacat gaaatgacta taaayggttt tttaatgaaa aaaaaaaaa aaaagggcgg 1920
ccgctctaga ggatccctc 1939

<210> 90
<211> 2032
<212> DNA
<213> Homo sapiens

<400> 90
ggcacaggcg gccgcccgcg cgccaagttc ctcagccctt ggctcctgcc cagtgtttag 60
ggtgttggcg gagaaaaggg gaagagtcat cgcctgtcgg ggctaggata tgatgggtga 120
gaggtgtcaa accaaattct ctcggtttgg aaacggagaa aatctaaaaa tgaggatgtg 180
aggaaagagt ccgctctcaa ggcgcgttgt ggtctatccg agccccgtcc cctgggctcc 240
ctcgggctgg ggtgaggcgg gcagctacgc gtggggtagg accatcttac gctgggaccc 300
cgccaaggag ccccaggaag taggtgaaag ggcaggggcg tggctctcgg ggcgccaccc 360
acgctcttga aatctgggtg attgcgagcg gccgctcagc gtcccccaca ccacagaccc 420
gcgccgccga cgacccagca gccgccatgg ctctgctccg aggtgtgttt gtagttgctg 480
ctaagcgaac gccctttgga gcttacggag gccttctgaa agacttcact gctactgact 540
tgtctgaatt tgctgccaag gctgccttgt ctgctggcaa agtctcacct gaaacagttg 600
acagtgtgat tatgggcaat gtcctgcaga gttcttcaga tgctatatat ttggcaaggc 660
atgttggttt gcgtgtggga atcccaaagg agaccccagc tctcacgatt aataggctct 720
gtggttctgg ttttcagtcc attgtgaatg gatgtcagga aatttgtgtt aaagaagctg 780
aagttgtttt atgtggagga accgaaagca tgagccaagc tccctactgt gtcagaaatg 840
tgcgttttgg aaccaagctt ggatcagata tcaagctgga agattcttta tgggtatcat 900
taacagatca gcatgtccag ctccccatgg caatgactgc agagaatctt gctgtaaaac 960
acaaaataag cagagaagaa tgtgacaaat atgccctgca gtcacagcag agatggaaag 1020
ctgctaatga tgctggctac tttaatgatg aaatggcacc aattgaagtg aagacaaaga 1080
aaggaaaaca gacaatgcag gtagacgagc atgctcggcc ccaaaccacc ctggaacagt 1140
tacagaaact tcctccagta ttcaagaaag atggaactgt tactgcaggg aatgcatcgg 1200
gtgtagctga tggtgctgga gctgttatca tagctagtga agatgctgtt aagaaacata 1260
acttcacacc actggcaaga attgtgggct actttgtatc tggatgtgat ccctctatca 1320
tgggtattgg tcctgtccct gctatcagtg gggcactgaa gaaagcagga ctgagtctta 1380
aggacatgga tttggtagag gtgaatgaag cttttgctcc ccagtacttg gctgttgaga 1440
ggagtttgga tcttgacata agtaaaacca atgtgaatgg aggagccatt gctttgggtc 1500
acccactggg aggatctgga tcaagaatta ctgcacacct ggttcacgaa ttaaggcgtc 1560
gaggtggaaa atatgccgtt ggatcagctt gcattggagg tggccaaggt attgctgtca 1620
tcattcagag cacagcctga agagaccagt gagctcactg tgacccatcc ttactctact 1680
tggccaggcc acagtaaaac aagtgacctt cagagcagct gccacaactg gccatgccct 1740
gccattgaaa cagtgattaa gtttgatcaa gccatggtga cacaaaaatg cattgatcat 1800
gaataggagc ccatgctaga agtacattct ctcagatttg aaccagtgaa atatgatgta 1860
tttctgagct aaaactcaac tatagaagac attaaaagaa atcgtattct tgccaagtaa 1920
ccaccacttc tgccttagat aatatgatta taaggaaatc aaataaatgt tgccttaact 1980
tcaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aagggggagg gg 2032

<210> 91
<211> 1788
<212> DNA
<213> Homo sapiens

<400> 91
ttcccaccgg cttccccaga ggtggaagaa acccgaracg ttccgaagtc aacgcaagca 60
aaggggagtg cgggtcgggg aggaatattc ttttggaaac gtaatattgg ccttggggct 120
ctccagccct ttgggacttc caatgggatc ttagaagcag ccgaagcagc gtgagggcgg 180

cagccagggc cagccacgat ttgaacgctc tgccttgcag ctcttctgga ccgaggagcc 240
caaagcccta ccctcaccat tcaccaggtt acagttctta tccgcgtgaa tacacatggc 300
tctgttacga aaaattaatc aggtgctgct gttccttctg atcgtgaccc tctgtgtgat 360
tctgtataag aaagttcata aggggactgt gcccaagaat gacgcagatg atgaatccga 420
gactcctgaa gaactggaag aagagattcc tgtggtgatt tgtgctgcag cagggaggat 480
gggtgccact atggctgcca tcaatagcat ctacagcaac actgacgcca acatcttgtt 540
ctatgtagtg ggactccgga atactctgac tcgaatacga aaatggattg aacattccaa 600
actgagagaa ataaacttta aaatcgtgga attcaacccg atggtcctca aagggaagat 660
cagaccagac tcatcgaggc ctgaattgct ccagcctctg aactttgttc gattttatct 720
ccctctactt atccaccaac acgaagaaag tcatctattt ggacgatgat gtaattgtac 780
aaggtgatat ccaagaactg tatgacacca ccttggccct gggccacgcg gcggctttct 840
cagatgactg cgatttgccc tctgctcagg acataaacag actcgtggga cttcagaaca 900
catatatggg ctatctggac taccggaaga aggccatcaa ggaccttggc atcagcccca 960
gcacctgctc tttcaatcct ggtgtgattg ttgccaacat gacagaatgg aagcaccagc 1020
gcatcaccaa gcaattggag aaatggatgc aaaagaatgt ggaggaaaac ctctatagca 1080
gctccctggg aggaggggtg gccacctccc cartgctgat tgtgtttcat gggaaatatt 1140
ccacaattaa cccccctgtgg cacataaggc acctgggctg gaatccagat gccagatatt 1200
cggagcattt tctgcaggaa gctaaattac tccactggaa tggaagacat aaaccttggg 1260
acttccctag tgttcacaac gacttatggg aaagctggtt tgttcctgac cctgcaggga 1320
tatttaaact caatcaccat agctgatata actctaccct taaaatattc cctgtataga 1380
aatgtggaat tgtccctttg tagccaacta taacattgtt ctttatgaat attacctttg 1440
atacatatga tccacaatat aaaaaccaaa aactactgtg tgcaaattat accttggacc 1500
atataggcat tgattaactt ctttaagtac atgtgataac tatggaaatc aagattatgt 1560
gactgaaaaa cataaaggaa gagacccatc tagataacag caatcaacct gcttaattct 1620
gaatgacaat tatatccaca aatttttaaa acttctacat gtatttttca catgaagatc 1680
tccttaacag gttgccaacc ttttctttta taaaactatt acatttaaaa tatggacgtc 1740
tgaaaaataa aatattcatc atttttaaaa aaaaaaaaaa aaaaaaa 1788

<210> 92
<211> 495
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (402)
<223> n equals a,t,g, or c

<400> 92
gggtcgaccc acgcgtccga ccacattcct cctctaaaga agcccctggg agcacagctc 60
atcaccatgg actggacctg gaggttcctc tttgtggtgg cagcagctac aggtgtccag 120
tcccaggtgc agctggtgca gtctggggct gaggtgaaga agcctgggtc ctcggtgaag 180
gtctcctgca aggcttctgg aggcaccttc agcagctatg ctatcagctg ggtgcgacag 240
gcccctggac aagggcttga gtggatggga gggatcatcc ctatctttgg tacagcaaac 300
tacgcacaga agttccaggg cagagtcacg attaccgcgg acgaatccac gagcacagcc 360
tacatggagc tgagcagcct gagatctgag gacacggcca tntattactg tgcgaraagk 420
ccctmagcgg gttatctatc ccaactacta ccacggtatg gacgtctggg gccaagggac 480
cacggtcacc gtctc 495

<210> 93
<211> 1377

<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1367)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1371)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1376)
<223> n equals a,t,g, or c

<400> 93
ggacccacgc gtccgagact tttgaaggaa gaaatcaatt atgatgataa actacaggta 60
agagttgggt gttctaggtc ctgttcttca ggctttttat attcagaaat atgatacatg 120
tataacagct taggcagtca ttgcctagtt ggtcacatta gggtgacaac caaagattaa 180
caccaacatg tatttaattg tatgatttat agtgtccctt ttggcttaac actttcaaac 240
atttttctta tatttggctt tcctagttcc ctattatttt tttaaatctg gaagttgtca 300
ttttttaatt aatttctgtc gaactgaagt gattagaaat atcaacatct ctttcaggtt 360
aaaaatattt tgtatcatgc agtcaaagaa atggtgagag ccttgaagat acacgaggat 420
gaagtagasg atatggaaga aaattaagtg tgatccagtt tgatattttt aggttgttga 480
actgggatta cttaaccttg aatgatgata tgtatgcaca ctgactttaa gcttcataaa 540
accatcagtg ccaagaaatt ctctttgtag taattacttg ttactgacac cacagcagta 600
tagcatatgt cacagctcct gtgattcaat gttataaaac aagcagaatt ttaaaagcag 660
cactatatag ctgttttgta ttatagtgta tatgatgttt gtgaaaatgc cagatttaaa 720
atgatgtatt tatttttggt aaaaaataaa aaattctatg ctatattgtt gatcaagtgt 780
aaatgtgacc ttgtacagtt tactaaaatt actgatattt ttcactacat tgagacagtt 840
actgtgagaa taggacacaa acaccagcta ttgcctgcat ctgggaaatt gctgaatcgc 900
acagcagtca tgtcataatc agaaaattac tgccaaataa ttgtaaaatt tgtaaagtat 960
aaagtatata aagtagatac taaatacaga cacttcaata ttttgttgaa gctattgact 1020
gtacaattaa acattttcaa aaggtgtaat ttatttaaaa ttgtctcatt ttggtaaaat 1080
ttatgtgaac ttttaaagct aaatattaaa cttaatatgc tatgtaaata tatacatata 1140
tacatttaat gatgtatttt tttaaaacat tggcttgctt ttgttaaagt gcaagtgtta 1200
catatggctt tgtacattaa agttgaaagg ggttttacat tttccattaa aaggacttta 1260
tcaaaaaaaa aaaaaaaaaa aaaamamaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1320
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaggggnggc nttttna 1377

<210> 94
<211> 2819
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (82)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (83)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (84)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2816)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2817)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2818)
<223> n equals a,t,g, or c

<400> 94
ttttgtattt ttttttagta gagacagggt ttcactgtgt cagccaggat ggtcttgatc 60
tctggcccaa gcttttaaaa cnnnaaaacg gtggccaggc acggcagcac acacttgtaa 120
ttctagcact tcaggaggcc gagatagaag gatcactcga gcccaggaat tcgagaccag 180
ccctgacgat ataaataggg aaagagagag agagagagag agagcgcgtg cacgcgaggg 240
agaatgcctg cccctctcca gcctggccaa cagaaggaga tcctgtctca aagaaagtga 300
aaatgcttca gctagaatta taggataatc ctgkgtgaga taatttacat agygactgga 360
agagttatta aatattgctt tcttgytgct aagttctgta gttgggttag atatctaatg 420
cgtaactatt gtgaaagtca agagattcta atttttccag aaaataatgt tgagtttcca 480
tgaagaacag gaagtactgc cagaaacttt ccttgctaat ttcccttctc tgataaagat 540
ggacattcac aaaaaagtaa ctgacccaag tgtggccaaa agcatgatgg cttgcctcct 600
gtcttcactg aaggctaatg gctcccgggg agctttctgt gaagtgagac cagatgataa 660
aagaattctg gaattttaca gcaagttagg atgttttgaa attgcaaaaa tggaaggatt 720
tccaaaggat gtggttatac ttggtcggag cctgtgacat ttgttgacac tgtgaactgt 780
ccaaaagtct cttaactgca ccttgtgaat ggtagttgag gtcttcatac agttcagcct 840
ctagaatggt aacaaatcag ccaattggat tcgaaacaaa gaagactatg taaaactcac 900
ccatcacact ttgagactac tcactggttg gaagaatata gtattgcagc aaatcctgta 960
tgaaagagag atgtgggctt cctttttgag tcttgtgtta ggtgctgaga ccttttacat 1020
gggcttatac agggagagag tcttcaataa atgtagtcag cactattttc tgcatccagt 1080
gtggttgcgt ttctcacctg agagtaatca agataacatc tgtcatcttc cttggtttat 1140
tgagtgaaat gcctctcagt cttaggggac atggcagaga tgaaagaaag aaagagtggg 1200
tttcagaagt gtcagggtgg agtgattcca agtgggatgg ttgtggcatt agtttaagct 1260
gaataaataa tttcaatttg ggcagttat tctgcttttt gtaaagccgt ggccaattgt 1320
ctcctgtaat gactgttggt tcaggcatgt tgtactttgt agggacaaat gtgcatttgt 1380

ttgtggcaaa agcctacaat tgacaaactt gtaaatttct ttgtatataa actagctgta 1440
acctgactat cctttgtgtt tactgttttt gtaaattttt ttcctctata aatgaaaggg 1500
tgttggttca gaatggcact ttgaataatg taaaccagtg aaaagtggat tttctttact 1560
tttgtctttg ggtttggggt tgtttttgtt ctttttgaag ttttattatt tttaaagtgc 1620
ctcccaccta ggcgtaggcc atgaccattt ggggtacgag agcctaattt tgtaggactt 1680
aatctgttga aaagtgcagt tacttctgga aattaacctc aatattaggt cagcatgtga 1740
aatgttggat ttgacatgtc aggtagggtt cagggactga ttggtcccat ttgccctcag 1800
gtcagttgtt taatctcaag acctgttact actgatttta ttaaatcaga gtctttaatt 1860
cttgcatgtt tgtatctaat ttctgaacga atgagcacac tttaaccagt tatttacagt 1920
tacctttttc ctttaaccgg attgtgaaag cttcatgtat tttaatttag attctgtgtt 1980
tttaagggtt ctgagcatga agctggcaga tagtcggcag gactcatttt ttcatcatgg 2040
ctggctgatt tctccataga ttgataacag tattttgtta tcttgcttct ctgtagtttt 2100
gcatcagctg tttaactttg agctgagtga ggggagaggg gtaaagagaa agaaacttaa 2160
gttttctttc acagaactcc accattgtgg gctttgagag agccctaaag cattgtacct 2220
agtggtacct agtgacttcc aaccaaagcc tttgagtatg cactaaatag gtgagaagaa 2280
aggagagaag gtttttaggt tagaaacctt taaccgatag aaggatatgg tatgttgtaa 2340
agctggaacc aagtttgcat ttttgagggc ttgagatgaa gggaagactc ttaccagata 2400
gtaagacagc tgagttttcc tcagttttct cgtcttaaca ctagtggaca attctagcat 2460
tttgtttgga ggatttcaga gttaacctca tggaattcag gattttttag caagtttgct 2520
tttggtttta tcttggcttt tagtaatcat gttggctggt ctggtcacag gtgactgtga 2580
aacagatgcc ctggtcttgc tttcatcact ctaggatcat gaagtgctat gctatttcct 2640
ggttatgaat attaaggttg gaattacatt tttattgatt gtttggatca gagctcagtt 2700
cctgtagaaa acgaactgta aaagaccatg caagaggcaa aataaaactt gaagtgaatg 2760
cttaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaannna 2819

<210> 95
<211> 705
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (488)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (682)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (684)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (687)
<223> n equals a,t,g, or c

<400> 95

gcggcctggc taactcctgc caggcagtgc ccttcccgga gcgtgccctc gccgctggta 60
cggctcctac ctggtctgga aagagctggg aggcttcaca gagaaggctg tggttcccct 120
gggcctctac actgggcagc tggccctgaa ctgggcatgg ccccccatct tctttggtgc 180
ccgacaaatg ggctgggcct tggtggatct cctgctggtc agtggggcgg cggcagcact 240
accgtggcct ggtaccaggt gagcccgctg gccgcccgcc tgctctaccc ctacctggcc 300
tggctggcct tcgcgaccac actcaactac tgcgtatggc gggacaacca tggctggcgt 360
gggggacggc ggctgccaga gtgagtgccc ggcccaccag ggactgcagc tgcaccagca 420
ggtgccatca cgcttgtgat gtggtggccg tcacgctttc atgaccactg ggcctgctag 480
tctgtcangg ccttggccca ggggtcagca gagcttcaga ggtggcccca cctgagcccc 540
cacccgggag cagtgtcctg tgctttctgc atgcttagag catgttcttg gaacatggaa 600
ttttataagc tgaataaagt ttttgacttc ctttaaaaaa aaaaaaaaaa aagggggccc 660
cgtaaccaat tggccctaaa gngngtngtt taaaattaat ggccg 705

<210> 96
<211> 3472
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (55)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (69)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3457)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3466)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3470)
<223> n equals a,t,g, or c

<400> 96
attaaagcca gaaccagatg atctcattga cgaagacctc aactttgtgc agganaatcc 60
cttatctcng aaaaaaccta cagtgacact tacatatggt tcttctcgcc cttctattga 120
aatttatcga ccacctgcaa gtagaaatgc agatagtggt gttcatttaa acaggttgca 180
atttcaacag cagcagaata gtattcatgc tgccaagcag cttgatatgc agagtagttg 240
ggtatatgaa acaggacgtt tgtgtgaacc agaggtgctt aacagcttag aagaaacgta 300
tagtccgttc tttagaaaca actcggagaa aatgagtatg gaggatgaaa actttcggaa 360
gagaaagttg cctgtggtaa gttcagttgt taaagtaaaa aaattcaatc atgatggaga 420

```
agaggaggaa gaagatgatg attacgggtc tcgaacagga agcatctcca gcagtgtgtc 480
tgtgcctgca aagcctgaaa ggagaccttc tcttccacct tctaaacaag ctaacaagaa 540
tctgattttg aaggctatat ctgaagctca agaatccgta acaaaaacaa ctaactactc 600
tacagttcca cagaaacaga cacttccagt tgctcccaga actcgaactt ctcaagaaga 660
attgctagca gaagtggtcc agggacaaag taggaccccc agaataagtc cccccattaa 720
agaagaggaa acaaaaggag attctgtaga aaaaaatcaa ggaactcaac agaggcaatt 780
attatcccga ctgcaaatcg acccagtaat ggcagaaact ctgcagatga gtcaagatta 840
ctatgacatg gaatccatgg tccatgcaga cacaagatca tttattctga agaagccaaa 900
gctgtctgag gaagtagtag tggcaccaaa ccaagagtcg gggatgaaga ctgcagattc 960
ccttcgggta ctttcaggac accttatgca gacacgagat cttgtacaac cagataaacc 1020
tgcaagtccc aagtttatag tgacgctgga tggtgtcccc agccccccag gatacatgtc 1080
agatcaagag gaggacatgt gctttgaagg aatgaaaccc gtaaaccaaa ctgcagcctc 1140
aaacaaggga ctcagaggtc tcctccaccc acagcagttg cacttgctga gcaggcagct 1200
tgaggaccca aatggtagct tttctaacgc tgagatgagt gaactgagtg tggcacagaa 1260
accagaaaaa cttttggagc gctgcaagta ctggcctgct tgtaaaaatg gggatgagtg 1320
tgcctaccat caccccatct caccctgcaa agccttcccc aattgtaaat ttgctgaaaa 1380
atgtttgttt gttcacccaa attgtaaata tgatgcaaag tgtactaaac cagattgtcc 1440
cttcactcat gtgagtagaa gaattccagt actgtctcca aaaccagttg caccaccagc 1500
accaccttcc agtagtcagc tctgccgtta cttccctgct tgtaagaaga tggaatgtcc 1560
cttctatcat ccaaaacatt gtaggtttaa cactcaatgt acaagaccgg actgcacatt 1620
ctaccatccc accattaatg tcccaccacg acatgccttg aaatggattc gacctcaaac 1680
cagcgaatag cacccagtcc tgcctggcag aagatcatgc agtttggaag ttttcatgta 1740
ctgatgaaag atactctaca gaacttgtca aatctttgaa acttggaata tattgctttc 1800
ataatatgaa gttttattgc ctatctatct gaagtgtcta atttttcaag tttgtaagtt 1860
tattatgtgg ttttaacatt gggtgttttt gttttgtttt tactatgaaa agacagctta 1920
aggaagagct aaattctgtt aaaatatttg ggcatgtttt gtgcactgct gttgtgagga 1980
tcagcatatg aaattgacat catggttagt catggtactg cagcttaggg ggctacacgg 2040
ttgctgtgtg agtggagaga tgcagtgagg cagttgtcat tattctaaaa attgtactac 2100
tttcactttt cccaaagatt atataatgtt cataatccac catgaaaaca gcattggcca 2160
aaggtactga ggctgcttaa aatattcaat tctgcttttt aatttttaag tgaatttagt 2220
ttgaaaagca tgattataca ggcctctcag gctgagtgct actttggtaa agttcccagt 2280
tttcctgcct tctgtgacag gatgaatgag gtgggtatgg acagtggagg cagctggaat 2340
ggcaagtgca gaaaatagga acagttctat acagtgctct catttactaa taacataatg 2400
ccttctaaat aatttttttg ggaaactaca ttatcacaaa attatacaaa ttttttttaca 2460
agtatttaca tactgtatct gaaaacagac tttaaagtca caagattata aatgtacata 2520
tgtattctca cattctgaaa aataacattc tcagaatcca cagaaaatat acttagttac 2580
tactgaagat aatttttgaa atgtaaaaat tagatttaaa tagtatattt taaatgacag 2640
aactataatt acagagatca gatcagatag gtaaactgca agatagatag gatgaaactt 2700
ttggcctact gtattactta cagagttttt ttgtgtgtgg tttttaaaac tgttaaggca 2760
agaagtgtca aatgctttag agttaaataa cagatcactg atttcaaaga cttggtgtat 2820
agtgttaaaa attaaagctt aaaaggtggt tagaaaagtg gattaatgca aaaggggtaa 2880
taaagactgc aacattctca ggaccaaatt aaactgctaa aaaaaaaaaa aaagttcatt 2940
gacttgctta gtcgtatact caaatgatga taaacctaca tgtgcaaagg ctcacgttta 3000
agattgtcaa gccagcagtc tactgttgtg ttgccattgc ttttccattg ggagaagaaa 3060
gaattaacca gtcattaaac catttggtaa gttgcacttt gctgtgctga tcccacagga 3120
aaggcttgaa acacgagaag cagcaaagac agagcacaca agtgcataag gctgttgtct 3180
tcggcttggg tgaaatgaca gttcctcttc attctaaagg tttactccat tgaatttaag 3240
gcatttgttc attccagtgt tgagatgctt tgcatctctg cagaagaaat ttattttaaa 3300
ttgtttaaat atctggaaat acttttagct atcatttata aagatagttt tgttctcagt 3360
ttcactataa attatagaac aaatgggaaa caagggttta atttagttca gccattttac 3420
aaggaaataa taaaatacta aaatctggak tgttcmntta cctttncccn cc          3472
```

<210> 97
<211> 1216
<212> DNA
<213> Homo sapiens

<400> 97
ggagcgtgac ttcatctcaa aaaaaaaaaa aaaaaaatta ttctgtacca tcacarcttt 60
tcacaacgat ggcaagcctt atgtcttggg agcctgtttt gctaggcaaa gttacaagtg 120
acctaatggg agctcaaatg tgtgtgtgtc tctctgtgtg tttgtgtgtg tgtgtgcact 180
caagacctct aacagcctcg aagcctgggg tggcatcccg gccttgccat tagcatgcct 240
catgcatcat cagatgacaa ggacaaccct catgacgaag caacatgaat tagggggcct 300
cttggccttg gtccaaaatt gtcaatcaga aatgaacata aaggactcca gagcagtggg 360
actgtctgtc aaaagactct gtatatcttt tgtggatgag ttttgtgaga gaacagagag 420
accattgtac ctggcacaag ggctsttcat gaaaagggag acttactggg aggtgcaaga 480
cagtggcatt tctcctctcc tcttgctgct cagcacagcc ctggattgca gccccgaggc 540
tgagaccaga caaagcccgg gaggcagaaa gatgctccaa gaaccaacac tatcaatgtc 600
tttgcaaatc ctcacaggat tcctgtgggt ccagctttgg aactgggaaa cctttcttcg 660
gatccgcact cattccactg atgccagctg cccctgaagg atgccagtac tgtggtgtgt 720
gagtctcagc agccgcccac acgctcctaa ctctgctgca tggcagatgc ctaggtggaa 780
atagcaaaaa caaggcccag gctgggggcca gggccagagg ggaaggccct ggattctcac 840
tcatgtgaga tcttgaatct ctttctttgt tctgtttgtt tagttagtat catctggtaa 900
aatagttaaa aacaacaaaa aaactctgta tctgtttcta gcatgtgctg cattgactct 960
attaatcaca tttcaaattc accctacatt cctctcctct tcactagcct ctctgaaggt 1020
gtcctggcca gccctggaga agcactggtg tctgcagcac ccctcagttc ctgtgcctca 1080
gcccacaggc cactgtgata atggtctgtt tagcacttct gtatttattg taagaatgat 1140
tataatgaag atacacactg taactacaag aaattataaa tgtttttcac atcaaaaaaa 1200
aaaaaaaaaa aaaaag 1216

<210> 98
<211> 1186
<212> DNA
<213> Homo sapiens

<400> 98
ggcacgagaa ataatcacct ggagtttgtt aaaccatatg gattctcagg ctcctctctt 60
gaagattctg attcagtagg tctgggagtg gcgccctgga ttttgatcaa aattgtagag 120
cattttaagg tgagtacctg agggagaact taaagacatc ttagttgggg agtagtcctt 180
ttgaatttta cagctagata taatcttcag tcagataaaa tttatgggag ctggtgtctt 240
atgcctgact cttagtaatt tcataccggt ttgaagtacg tgtgcccatg cctaaagcct 300
tgactttcag aatgttgtct tttgattctt ctgtcttgat ttgattaggg gtgaaattta 360
gaagtcttag taatgtaact tgaagatgtt aaacaaaaat ctcaagtaaa atgaaaagca 420
aatatgggct actgaattaa gaaactggca ttctagtatt aaatcctcac ttcaggagct 480
tttaaaaata ctgagacccc cccataacca gagattcaga ttcaaagact gaggatagga 540
ccttagcatt gtagctattt aaagtttcta atgtgcaccc agggttggga atcaccaatg 600
tgggtgtgaa aatgcctaca aagggtttta gtgccttaga agtcctaaga agcccaatct 660
gtatcaaagc agatccattt tgcaaggatc tttcttttag aactttctca gttctcttag 720
taagaacttt agaagtaatc ttgataataa gcacagacag cctaacagca gaggcaactt 780
aaataactcc tgagcagttg gcactagaac agaatacttg gaatgacacc aaagttaacc 840
aagtccagca tatgtccaaa gagttaagtg tttcatttac tgtagcattc tgggtgagaa 900
attggttgct gaaatcttaa gacagtggtc tcaaccttgg ctgcacattg gaatcacctg 960

tagggtttta aagcatccaa atggtaatta acaggcagca aaacttcaga actagttctg 1020
catctactgt gcaaagatca tgattaactg tcaagacact ggtagaacag aacaagcaaa 1080
agattaagag ttcaaaagta aatgcaacca wtttaacatg tagtgttatt aaaaaattac 1140
aaaggcctag accagcctgg gcaacagaga ccatgcttaa aaaaaa 1186

<210> 99
<211> 1120
<212> DNA
<213> Homo sapiens

<400> 99
aattcggcac gaggtgacca ggagtcgacg tgtgcagaag tcctggtaat ctggtccttg 60
ttcccgtctg gataccagct tccttcagca gcgcaggcgg tggtccctga ggcccgtgga 120
aggagtcaaa cttgcgggaa ttttgcagtt tatctgcagg gctgttgttt ccagcaagac 180
ccaaagctag aaaaggagga ggaagaaact gacccgatca gtgccagaag tcattgtatt 240
caaagaagaa taagcaagaa agaaaagaag gaaggaagag aggtagacag atacaagatg 300
aaatcctgtc aaaaaatgga aggaaaacca gaaaatgaga gtgaaccaaa gcatgaggaa 360
gagccaaagc ctgaggaaaa gccagaagag gaggagaagc tagaggagga ggccaaagca 420
aaaggaactt ttagagaaag gctgattcaa tctctccagg agtttaaaga agatatacac 480
aacaggcatt taagcaatga agatatgttt agagaagtgg atgaaataga tgagataagg 540
agagtcagaa acaaacttat agtgatgcgt tggaaggtta atcgaaacca tccttacccc 600
tatttaatgt agtttacctt gattttatc tgatattaac aataccatat agcttgcttt 660
ttattagcat ttcctgatat tcctttgtcc atatttctac ttataacctg ttgctattaa 720
tggttttaga tgtatctctt gttatctgca tctcattgtt tattgtattt tgaaccaatc 780
tacaagtctc tgtcttttaa taaaagaact ttacacattt gtaaaaaaga ggttcttggt 840
aagatataaa atggaaaaag gctaagtaat atgtgaatat catatttttg aaaggtaaaa 900
agtacatttg tatattacat atatggacat aacttgtgaa ggatgaaaga aagtacagcc 960
tctcggtggt gggattatga atgattttc tccttttgct tgtttgtatt ttctatattc 1020
ctaaaattaa cacacattat tattgctaga ataataaaag ttttataaaa aagaagcaaa 1080
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aggggggga 1120

<210> 100
<211> 1225
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (287)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (288)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1213)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1225)
<223> n equals a,t,g, or c

<400> 100
cttgctctgt cacccaggct gggagtgcag tggcatgatc tctgcaacct ctacctccca 60
ggttcaagca attcttgtgc ctcagcctcc caagtaactg ggactacagg tgcacgctac 120
cacacctggc tgattttttt tatgttttag tagagacagg gtttcaacca tgttgcccag 180
gttggtctca aactcctgag ctcaggcaat ccacccgcct tggcctccca aagtgctagg 240
attacaggtg tgagccacca cacccagcta ttttttcttt cggttnnnaa ttttaaagtt 300
gggggggtc tcaatttgtt taccctggct ggtctcgaac tcccggactt aagcgatcct 360
ctggctccaa gcccactacc agtctcaggt ttctttacta aaagatcact acctttttt 420
ctcttatctg ctgccatgtg agatgtggct ttcaccttcc gccatgattg tgaggccttc 480
ccagccacgt rgaactgtaa gtccaataaa cctcttttgt aaattaaaaa aaaaaaatca 540
ctatttaaga tactaggatg gattgtgact gttgaggagt acttacatat cctacatttg 600
actacattat ttccaaacca agtattccat ccaaaggaac atactgctat catagagacc 660
aaggagggac tgtttaaggt tgccaaggtg aagcgagctg agaggctttg tcctcgtgcc 720
agtaactctg aaatctctct taattcctgc tgtccaggca gcagaatgcc atggtttccc 780
caagtaggta gctgctttag cakttaaagc ccaaatgtct gttctgttga tcagaggtct 840
ctgaatttct gaagtggtgt ttcgtttctg gtgactgagt taatccttta caatccctct 900
tgtaaagtgt gctaatagaa agaatccacc tttcaaagct gcagaaccag accgtgccct 960
aaattgacca acgtarctga tgtgcctcag gaagtctctt gccagctgtc cctgtgaaga 1020
ccccctcctc ccccccagct gctgccttgc acactgaagc atctcagact gtgcaaagcc 1080
rtgtagtcat caagacagta aatcccaggg cttggttaag tgctgtgtga taacttgttt 1140
ggatgagact taacttaaaa ccacttacaa taaacttggg aaactaccgt caaaaaaaaa 1200
aaaaaaaaat ttnggggggg cccgn 1225

<210> 101
<211> 1213
<212> DNA
<213> Homo sapiens

<400> 101
ggtagataaa ttgactagct gataagtaaa attaaaagag gaattttctc tttcaggtag 60
gattattgac tgtgctttta ctgtcacttt taatcccaaa tatgatacgt tattaaaagc 120
tgtaaaagat gctactaaca ctggaataaa gtgtgctgga attgatgttc gtctgtgtga 180
tgttggtgag gccatccaag aagttatgga gtcctatgaa gttgaaatag atgggaagac 240
atatcaagtg aaaccaatcc gtaatctaaa tggacattca attgggcaat atagaataca 300
tgctggaaaa acagtgccga ttgtgaaagg aggggaggca acaagaatgg aggaaggaga 360
agtatatgca attgaaacct ttggtagtac aggaaaaggt gttgttcatg atgatatgga 420
atgttcacat tacatgaaaa attttgatgt tggacatgtg ccaataaggc ttccaagaac 480
aaaacacttg ttaaatgtca tcaatgaaaa ctttggaacc cttgccttct gccgcagatg 540
gctggatcgc ttgggagaaa gtaaatactt gatggctctg aagaatctgt gtgacttggg 600
cattgtagat ccatatccac cattatgtga cattaaagga tcatatacag cgcaatttga 660
acataccatc ctgttgcgtc caacatgtaa agaagttgtc agcagaggag atgactatta 720

aacttagtcc aaagccacct caacaccttt attttctgag ctttgttgga aaacatgata 780
ccagaattaa tttgccacat gttgtctgtt ttaacagtgg acccatgtaa tacttttatc 840
catgtttaaa aaagaaggaa tttggacaaa ggcaaaccgt ctaatgtaat taaccaacga 900
aaaagctttc cggactttta aatgctaact gtttttcccc ttcctgtcta ggaaaatgct 960
ataaagctca aattagttag gaatgactta tacgttttgt tttgaatacc taagagatac 1020
tttttggata tttatattgc catattctta cttgaatgct ttgaatgact acatccagtt 1080
ctgcacctat accctctggt gttgcttttt aaccttcctg gaatccattt tctaaaaaat 1140
aaagacattt tcagatctga gaaaaaaaaa aaaaaaaaaa aaaaaaacyc gggggggccc 1200
ggtmcccaat tcg 1213

<210> 102
<211> 1564
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1509)
<223> n equals a,t,g, or c

<400> 102
ctgatgcagt aatatattca gtttatctat gcattgctgg ggtcttgata taagatggaa 60
acagtgtttc ttatctaaag ttttgattat cagcaagttg aatggacact ttagttattt 120
aaataaagat ttttgaccaa aatccagaaa atggtatgag agaaaaataa attccagcta 180
gtttaataga tttttaaatg tcaatctgat tttagctctt agagagtgct aactagctkg 240
taatgtttac ttttaattcc ttgttaaaat gaggcaataa tttgcaagat ttttgtatat 300
aagtgtaaat tcttcatatc tttttagatc taattcaata ttttctgact acttctgcca 360
tgtataatac catttttgtg catgcttgga tgtgacattc ataaattgta ccactatgac 420
tttatccatg taaaatagct atttattgaa ttttctttta aaagctggat ttactgggtt 480
tttttttttct ctcagtttaa acatcttaac agaraawttg ttactgttta ttaaaagaat 540
tgcatttgga agcaagaaaa caaccggatt tgcaatcatg tgaagaaaca ataatgcctt 600
tattatcaag tgttaagcac aattcttata acaaactgtg ataaattctt tttgtttttt 660
tttcctttgc cccattattt tcttatgaac aaaccaaaaa ttcatggtga gcagttgcag 720
tgttggctga tatatctttt atgtacaggg aatttgaaaa ggacagtgga ttcatttaga 780
agtgtaactg gtgctgtgat tatagcaata catttgttag ttgtacttca tctttttcat 840
gctagctttt taaatgttta gttttcctct tgtcatggtc agctgctgaa tttacttgaa 900
ggatgtagaa tactgtttaa aaaatactaa aatttgtaca attagatcaa agaattgtgc 960
aatcatttcc tttttaattt ttaaaatgtt gaggctcata aatatttgag aacatcagat 1020
ctaatagagc atagtgatac tatttaatta accaaagtct ctagtgaata tttcaacttt 1080
gaatgtaaac taacaaataa acctgaccac caaggagatt gtttgcccag agtttcaaag 1140
cacattgtct acaaatggaa attgaaataa tttataaaat attgacgtta ctatgttttt 1200
taaaaagttc ctaatttttt cactaaatgg aggaaactat tagttttatt gttaaatatg 1260
gtagatatta atattcctct tagatgacca gtgattccaa ttgtcccagt ttgaaataag 1320
taccctgtga gtatgagata aattagtgac aatcagaaca agtttcagta tcagatgttc 1380
aagaggaagt tgctattgca ttgattttaa tatttgtaca taaacactga ttttttttgag 1440
cattattttg tatttgttgt actttaatac ctggtgtaca gttccagaaa taaaaatctg 1500
ggaatcttna aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa gggcggccgc 1560
tcta 1564

<210> 103
<211> 1457

<212> DNA
<213> Homo sapiens

<400> 103
aattcggcac gagccgttca agggctctta gaggtggcca aagactcaat cccccgaagt 60
cactggaaaa agaccccagt ggtcctaaag gcaacagcag gactacgctt actgccagaa 120
cacaaagcca aggctctgct ctttgaggta aaggagatct tcaggaagtc acctttcctg 180
gtaccaaagg gcagtgttag catcatggat ggatccgacg aaggcatatt agcttgggtt 240
actgtgaatt ttctgacagg tcagctgcat ggccacagac aggagactkt ggggaccttg 300
gacctagggg gagcctycac ccaaatcacg ttcctgcccc agtttgagaa aactctggaa 360
caaactccta kgggctacct cacttccttt gagatgttta acagcactta taakctctat 420
acacatagtt acttgggatt tggattgaaa gctgcaagac tagcaaccct gggagccctg 480
gagacagaag ggactgatgg gcacactttc cggagtgcct ktttaccgag atgkttggaa 540
gcagagtgga tctttggggg tgtgaaatac cagtatggtg scaaccaaga aggggaggtg 600
ggctttgagc cctgctatgc cgaagtgctg agggtggtac gaggaaaact tcaccagcca 660
gaggaggtcc agagaggttc cttctatgct ttctcttact attatgaccg agctgttgac 720
acagacatga ttgattatga aaaggggggt attttaaaag ttgaagattt tgaaagaaaa 780
gccagggaag tgtgtgataa cttggaaaac ttcacctcag gcagtccttt cctgtgcatg 840
gatctcagct acatcacagc cctgttaaag gatggctttg gctttgcaga cagcacagtc 900
ttacagctca caaagaaagt gaacaacata gagacgggct gggccttggg ggccaccttt 960
cacctgttgc agtctctggg catctcccat tgaggccacg tacttccttg gagacctgca 1020
tttgccaaca ccttttaag gggaggagag agcacttagt ttctgaacta gtctggggac 1080
atcctggact tgagcctaga gatttaggtt taattaattt tacacatcta atgtgaactg 1140
ctgcctaacc actcaagagt acacagctgg caccagagca tcacagagag ccctgtgagc 1200
caaaaagtat agttttggaa cttaaccttg gagtgagagc ccagggacag gtccctggaa 1260
accaaagaaa aatcgcattt caaccctttg agtgcctcat tccactgaat atttaaattt 1320
tcctcttaaa tggtaaactg acttattgca atcccaagac ccatcaatat cagtattttt 1380
ttcctcccta tacagtgccc tgcccacccct tatctgcacc cacctcccct gaaaaagaaa 1440
aaaaaaaaaa ctcgtag 1457

<210> 104
<211> 785
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (748)
<223> n equals a,t,g, or c

<400> 104
gtgctgatga aaatatggag gaaatgaaac tctcatgggt tttgcaggga atctaagtca 60
gtgctgtgtt gtgaatgtag gtgtaccctt tgaattcata tgttgaatcc taaccccccaa 120
agcaatggca ttaagaggtg gggcctttgg ggctgggata caggagtgag ccactgcgcc 180
tggctgatcc cagcactttt caaatgatgc cgctcaaagc cgtgacttgg cctactttga 240
acagcaaact tgttgctgct gttgtcaacc tgaaggcctc tcaaatgcca gcttcaagca 300
gggtgtgaat tggccagtgt cagatctcag gagtcctgtg ttgagagtgt ggctttcagc 360
tgcgggggagc tgcacttggt ggggaaagcc aggcaggtca ccctcacagc cagataatgt 420
ggaggtcaga acccaaggaa gggagtgaga cctccactcc cagtgggggga cctggccacc 480
catccttggg gacctgagaa agcgtacttc accttggggt gaaggctggg tggggccaga 540
gggaccagtg ccctcctcag tgcttagggg cagagccacc tgcagcaatg gtatctgcat 600

attagcccct ctccaccttc tttctcccgc tgaatcattt ccctcaaagc ccaagagctg 660
tcactgcttc tttctccctg ggaagaatgc gtggactctg cctggtgata gactgaagcc 720
agaacagtgc cacaccctcg ccttaatncc ttgctaggtg tctcagattt atgagacttc 780
ttagt 785

<210> 105
<211> 921
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<400> 105
agggaaggac cctcccctag agtctctgga gggaactggn atacaattgc agagtgcact 60
aaacagttgc cccagaaaga catgtcttgt tttaaagccc agaacctgaa attattatag 120
attttattcg gtaataagga actttgcatg tgtaattact taaggatatg aagatgagat 180
tgtcctggat tattaagcac cctaaatgcc atgtacaggt gtccttccaa gagaacagaa 240
gaggagacac agacacagag caggaggaca cgtggagaca gaggcagact ggagtgatgc 300
ggccacaagc ccagggacac ctggagcccc caggagctgg gagaggcagg aaggatcctc 360
ccctagagcc tccaggggga actggaggat gcgtaagaga cccagaactt ccacagaagg 420
aggaaaatta acctcctgct tctctagact gttccaaagc tgaaccctag aaagcaaagc 480
tgatacagaa gcatccaggc tgcaggagta caggtcgcaa gtgctgagcg tgggccttgg 540
gtgtgtctca tgggggaaaa aaaactgtga aaaacctcag agtagcatct tcacagtaac 600
gcacggacga tccctaaact gccttgtaaa caaaaatgag agcttgagtc agaggaagcc 660
gagacaatat ccttcctcga caacgtgcga gaaccctgac gtcccccagc aaaggaagac 720
gttgcaagca ggcaaaatgc gtcgattttt ttttttgtc agtatgatga tttttgcagc 780
cacttggcta tggagagcag ccgacacccc ctcttacagc cgtggatgtt tcctggaagc 840
tgactcagtc tgttcactgg ttgagctttg agtgaaaaga taacacaggt ctattgactc 900
acacacatgt tttaagatgg a 921

<210> 106
<211> 592
<212> DNA
<213> Homo sapiens

<400> 106
gtgatctgca tgtggcaggg ctgcgcagtg gagcggccag tgggcaggat gacgagccag 60
acccctctgc cccagtcccc ccggcccagg cggccgacga tgtctactgt tgtggagctg 120
aacgtcgggg gtgagttcca caccaccacc ctgggtaccc tgaggaagtt tccgggctca 180
aagctggcag agatgttctc tagcttagcc aaggcctcca cggacgcgga gggccgcttc 240
ttcatcgacc gccccagcac ctatttcaga cccatcctgg actacctgcg cactgggcaa 300
gtgcccacac agcacatccc tgaagtgtac cgtgaggctc agttctacga aatcaagcct 360
ttggtcaagc tgctggagga catgccacag atctttggtg agcaggtgtc tcggaagcag 420
tttttgctgc agtgccgggc tacagcgaga acctgggagc tcatggtgcg cctggcacgt 480
gcagaagcca taacagcacg gaaktccagg tgyttgtgtg cctggtgaaa cttgagggag 540
caggatgcat tattattcag aggtcctgtg tttttcttgc aggataagaa gg 592

<210> 107

<211> 2248
<212> DNA
<213> Homo sapiens

<400> 107
tctgggagta cgacatggcg cgcgagctgc gggcgctgct gctgtggggc cgccgcctgc 60
ggcctttgct gcgggcgccg gcgctggcgg ccgtgccggg aggaaaacca attctgtgtc 120
ctcggaggac cacagcccag ttgggcccca ggcgaaaccc agcctggagc ttgcaggcag 180
gacgactgtt cagcacgcag accgccgagg acaaggagga acccctgcac tcgattatca 240
gcagcacaga gagcgtgcag ggttccactt ccaaacatga gttccaggcc gagacaaaga 300
agcttttgga cattgttgcc cggtccctgt actcagaaaa agaggtgttt atacgggagc 360
tgatctccaa tgccagcgat gccttggaaa aactgcgtca caaactggtg tctgacggcc 420
aagcactgcc agaaatggag attcacttgc agaccaatgc cgagaaaggc accatcacca 480
tccaggatac tggtatcggg atgacacagg aagagctggt gtccaacctg gggacgattg 540
ccagatcggg gtcaaaggcc ttcctggatg ctctgcagaa ccaggctgag gccagcagca 600
agatcatcgg ccagtttgga gtgggtttct actcagcttt catggtggct gacagagtgg 660
aggtctattc ccgctcggca gccccgggga gcctgggtta ccagtggctt tcagatggtt 720
ctggagtgtt tgaaatcgcc gaagcttcgg gagttagaac cgggacaaaa atcatcatcc 780
acctgaaatc cgactgcaag gagttttcca gcgaggcccg ggtgcgagat gtggtaacga 840
agtacagcaa cttcgtcagc ttccccttgt acttgaatgg aaggcggatg aacaccttgc 900
aggccatctg gatgatggac cccaaggatg tcsgtgagtg gcaacatgag gagttctacc 960
gctacgtcgc gcaggctcac gacaagcccc gctacaccct gcactataag acggacgcac 1020
cgctcaacat ccgcagcatc ttctacgtgc ccgacatgaa accgtccatg tttgatgtga 1080
gccgggagct gggctccagc gtttgcactg tacagccgca aagtcctcat ccagaccaag 1140
gccacggaca tcctgcccaa gtggctgcgc ttcatccgag gtgtggtgga cagtgaggac 1200
attcccctga acctcagccg ggagctgctg caggagagcg cactcatcag gaaactccgg 1260
gacgttttac agcagaggct gatcaaattc ttcattgacc agagtaaaaa agatgctgag 1320
aagtatgcaa agtttttga agattacggc ctgttcatgc gggagggcat tgtgaccgcc 1380
accgagcagg aggtcaagga ggacatagca aagctgctgc gctacgagtc ctcggcgctg 1440
ccctccgggc agctaaccag cctctcagaa tacgccagcc gcatgcgggc cggcacccgc 1500
aacatctact acctgtgcgc ccccaaccgt cacctggcag agcactcacc ctactatgag 1560
gccatgaaga agaaagacac agaggttctc ttctgctttg agcagtttga tgagctcacc 1620
ctgctgcacc ttcgtgagtt tgacaagaag aagctgatct ctgtggagac ggacatagtc 1680
gtggatcact acaaggagga gaagtttgag gacaggtccc cagccgccga gtgcctatca 1740
gagaaggaga cggaggagct catggcctgg atgagaaatg tgctggggtc gcgtgtcacc 1800
aacgtgaagg tgaccctccg actggacacc caccctgcca tggtcaccgt gctggagatg 1860
ggggctgccc gccacttcct gcgcatgcag cagctggcca agacccagga ggagcgcgca 1920
cagctcctgc agcccacgct ggagatcaac cccaggcacg cgctcatcaa gaagctgaat 1980
cagctgcgcg caagcgagcc tggcctggct cagctgctgg tggatcagat atacgagaac 2040
gccatgattg ctgctggact tgttgacgac cctagggcca tggtgggccg cttgaatgag 2100
ctgcttgtca aggccctgga gcgacactga cagccagggg gccagaagga ctgacaccac 2160
agatgacagc cccacctcct tgagctttat ttacctaaat ttaaaggtat ttcttaaccc 2220
gaaaaaaaaa aaaaaaaaaa cctctgcc 2248

<210> 108
<211> 785
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature

<222> (769)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (771)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (785)
<223> n equals a,t,g, or c

<400> 108
cccagcccat aaagatctgt gaccggcagc cccagacctg cctgccttcc tgacttctgt 60
tccagagcaa aggtcattca gccgcttgaa tcagcctttt ccccccaccc ggtccccaac 120
tttgtttacc cgataaggaa ggtcagcatt caaagtcaag aagcgccatt tatcttcccg 180
tgcgctctac aaatagttcc gtgagaaaga tggccgggaa ctcgatcctg ctggctgctg 240
tctctattct ctcggcctgt cagcaaagtt attttgcttt gcaagttgga aaggcaagat 300
taaaatacaa agttacgccc ccagcagtca ctgggtcacc agagtttgag agagtatttc 360
gggcacaaca aaactgtgtg gagttttatc ctatattcat aattacattg tggatggctg 420
ggtggtattt caaccaagtt tttgctactt gtctgggtct ggtgtacata tatggccgtc 480
acctatactt ctggggatat tcagaagctg ctaaaaaacg gatcaccggt ttccgactga 540
gtctggggat tttggccttg ttgaccctcc taggtgccct gggaattgca aacagctttc 600
tggatgaata tctggacctc aatattgcca agaaactgag gcggcaattc taactttttc 660
tcttcccttt aatgcttgca gaagctgttc ccaccatgaa ggtaatatgg tatcatttgt 720
taaataaaaa taaagtcttt aaaaaaaaaa aaaaaaaaaa gggggccncc nctaaaaaat 780
ccaan 785

<210> 109
<211> 611
<212> DNA
<213> Homo sapiens

<400> 109
ggcacagtgg tggaaggtgg gtgtgtagtc gtggtacttt acgcctcggt gtttagggag 60
gagcctaagg taaggagtca gaaacgggga gtaaccgagc tgcggctttt atataaggtc 120
agtggtaggt aaggaagggg ccttaacctc tgctggtgac cagaagcctg catttctgca 180
ttctgcttaa ttccctttcc ttagatttga aagaagccaa cactaaacca caaatataca 240
acaaggccat tttctcaaac gagagtcagc ctttaacgaa atgaccatgg ttgacacaga 300
gatgccattc tggcccacca actttgggat cagctccgtg gatctctccg taatggaaga 360
ccactcccac tcctttgata tcaagccctt cactactgtt gacttctcca gcatttctac 420
tccacattac gaagacattc cattcacaag aacagatcca gtggttgcag attacaagta 480
tgacctgaaa cttcaagagt accaaagtgc awtcaaagtg gagcctgcat ctccacctta 540
ttattctgag aagactcagy tctacaataa gcctcatgaa gagccttcca actccctcat 600
ggcaattgaa t 611

<210> 110
<211> 664
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (72)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (614)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (616)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (633)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (649)
<223> n equals a,t,g, or c

<400> 110
aattcggcac gagtttggtt tttncctcta tgtaggtatc tggtaaagta atgaatttat 60
cacaaatttt tnccaggccc tttctggtta ctgtggcttt atggcagcca rcctttatgc 120
tcgttccata tttggtgaag atgcacttgc aaatgtcagc attgagaagc caattcacca 180
gggaccagat gctgctgtta ccggccatat aagaattcgt gcaaagagcc agggaatggc 240
cttaagtctt ggagataaaa tcaacttgtc acagaagaaa actagtatat aaaaataaac 300
aaaaagtcct tgaagcttta cagttaattt aggtatgggc ttactggact ccaacatctt 360
ttgtactctt tcatgcttat atagaatctg agttcatgct gaatactttt cagccaataa 420
tttatagcct ttcccttaaa tcaagattga gtttaaaatt atagtttgtc ttttgtctta 480
acagttctga atgctgtcct caaagtatat aatgtttcat gtaccaagac cctttttcaca 540
gtcaataaac agatctattc ataaaaaaaa aaaaaaaaag ggcggcccgc tctagaggac 600
cccaagctta cgtncncgtg cattgcgacg tcntagctct tttataggng tcaccctaaa 660
tttc 664

<210> 111
<211> 4065
<212> DNA
<213> Homo sapiens

<400> 111

```
tcccgccgcc gcccgctgcg tccgcccagc gccagtccgc gtcccgaccg gcccgcggca 60
gcctgcgccg gccatggcca cctccccgca gaagtcgcct tctgtcccca agtctcccac 120
tcccaagtcg cccccgtccc gcaagaaaga tgattccttc ttggggaaac tcggagggac 180
cctggcccgg aggaagaaag ccaaggaggt gtccgagctg caggaggagg gaatgaacgc 240
catcaacctg cccctcagcc caattccctt tgagctggac cccgaggaca cgatgctgga 300
ggagaatgag gtgcgaacaa tggtggatcc aaactcacgc agacscccaa gcttcaagaa 360
ctgatgaagg tattaattga ctggattaat gatgtgttgg ttggagaaag aatcattgtg 420
aaagacctag ctgaagattt gtatgatgga caagtcctgc agaagctttt cgagaaactg 480
gagagtgaga agctaaatgt ggctgaggtc acccagtcag agattgctca gaagcaaaaa 540
ctgcagactg tcctggagaa gatcaatgaa accctgaaac ttcctcccag gagcatcaag 600
tggaatgtgg attctgttca tgccaagagc ctggtggcca tcttacacct gctcgttgct 660
ctgtctcagt atttccgtgc accaattcga ctcccagacc atgtttccat ccaagtggtt 720
gtggtccaga aacgagaagg aatcctccag tctcggcaaa tccaagagga aataactggt 780
aacacagagg ctctttccgg gaggcatgaa cgtgatgcct ttgacacctt gttcgaccat 840
gccccagaca agctgaatgt ggtgaaaaag acactcatca ctttcgtgaa caagcacctg 900
aataaactga acctggaggt cacagaactg gaaacccagt ttgcagatgg ggtgtacctg 960
gtgctgctca tggggctcct ggagggctac tttgtgcccc tgcacagctt cttcctgacc 1020
ccggacagct ttgaacagaa ggtcttgaat gtctcctttg cctttgagct catgcaagat 1080
ggagggttgg aaaagccaaa accgcggcca gaagacatag tcaactgtga cctgaaatct 1140
acactacgag tgttgtacaa cctcttcacc aagtaccgta acgtggagtg aggggctgcc 1200
ctgggcccac cactgcccaa gagttcttgc tgttggcgta ctggaccctc ctccgaactg 1260
ccttaccctg cttattcctg tctcttgcac tgtgctctcc cacaagtcca gctgcaaccc 1320
agagatagtg gaaactgaaa ttaggaagga aatcatcaat aactcagtgg gctgacccat 1380
ccctcccagg cgctggggac caacctagca atgaaggttg ggaaggttgt tcccttcccg 1440
gtgccaggtc cagatttccc tccatgattt gggaaccagc ttaggcaaaa gagtccccac 1500
aagatgaaaa taaagatcct agttaccatt caaaggatgc taactgtgtg tcaggcccca 1560
cactaagtgc tctgctctga tatactcaag gccattaatc ttcaggactc ccattgacgt 1620
aggtgtttca ttcccctttt acagatgagg aaactaaggc ttggaggtta aatgacttgc 1680
cagaagttgg aatttttttc ctctttgaac ataacctctc ccttctccct aaaggtaacc 1740
actattctga gtccaatcat caaggttttg cttttctttt tagctaagta tgcattcctc 1800
aatagtagac agtacaacat gtttataaca agccaattac attatgttct ttgcatgttc 1860
taaagttgtg tatgtgtgtg cacatctgag cacgtgcaca tgtacacctg agccaaaaac 1920
acgagaaccc actgatctca ccactggggc aagctaggtc agagcttagt gattcacact 1980
gaaattggca aattggattt aacccaatta atagtgtgtg tgtggcagga gtcatgtccc 2040
tcacatcctt tgtacaaatg aaaattactc ttaattcctt cagatttata ataactctgt 2100
actttggttt cagggtgaca tttgggaagg attttgttta gaattaatgg agtggcacat 2160
tttgcagcct ttttgcttga ttgcatgtaa tggaaatgcc ctatattttc ctgcaaaata 2220
agtactaaat tcattatcgt taagcaaatg tacaatatgc tcaggcaccg cagagagctg 2280
ggcacgggcc catgtgagca tcactttgga agtagggctc ttcaacaggg acccttgaac 2340
tttaaagaaa ggaacttctt tttgccttct aattgatcat ttagactatt ctggctaagt 2400
ctgcccacat gtaattaccg gctaattcaa gcgaggaaaa atgtaagtca tttagaccaa 2460
agccaagcag tttctttgcg tgggttactc aagggcttgt ggttacttgt atctcctcta 2520
tgtgaacttg actttgaaag acagagctct agtgtgccag cctgctaagt cctgtaagaa 2580
tagggaaggg cggagggggg tgggcagtga ctaggggacg agaagcatgg ggaaaatatt 2640
tgcactctaa acatacagag atagaggtgg ggcttgtggt acttaacact tgtagccatc 2700
aactgactga gaccttgggc taaataatca attgtgctga tattacatct cgttatggaa 2760
tgttcctaaa tatgccaggt agacaccagc ccaagtaccc tcctccagaa gtctgtgact 2820
accttgtcac tactttaggc ccattccaca aagcccatct ctggtttgag aattcatttt 2880
gatctgtatc tacaccaccc aaagttaggc ctcctataat gtccaaaaca ttcctttcag 2940
ccttttttatt tcttactgta ctgtctctta ctgtactgtc tatctgcagt aattgaggac 3000
ccataaaatt tagataacta catgtctttg ctcttagaat tgtcactcag cataatgagc 3060
```

atttaacata caaaggcaat gtactgtttt gtgttgatct atgtaaaaga atacaattct 3120
tttttacata attagtgaaa ttttattttt tattaggaaa cactaaatag tgtaatattt 3180
cttttgcttt taaaaaaatt cctggtagca aatcaagata aataattgct tcattttctt 3240
gagcaatact gaagcaggat gaagtaagag gaatgcattc atttaaacat gctttgcttt 3300
atgaattttg tctcttttttt ggtctctttt tcttatattc aagttacaaa tgtacaagta 3360
tccttactaa gagtgctcct tttgtatttt acatatatac agtatgaaaa tacattggaa 3420
cactaggaaa gtttttaaat aacagttcta atttatcaga aaattgtgtt ttgggattga 3480
gttctttgtc tcagcccaga atcccaggtc ctgggcctgg ttttctaatg ctgtcatctc 3540
agttcgatat tttactttag aayctggaat ctcctactta atatatgacc atgactttga 3600
aaggcaaaag aggaatcaag aataaataaa acaaacttaa tcttcatctt taaaaaaaag 3660
aaaaaagaaa ccaaaatgag aatcaacact tcataggctc actgggtttt cttttctttt 3720
ctgttaattt aaactcagtt atttttaatg cttaatacat acatggtgca aatttaaaa 3780
agcgcaaata ggtatctagt ggaaaaccta agcctccctc tctctccggc acccattacc 3840
tctccctgga ggcaactgtt ttgatccatt tcttacacac actgccagag atactctagg 3900
catgtaaagc acaaacatac atataaaatc tgcgggcttc aaaaaatata agtaggatgt 3960
catctatact gtcatacact ttgtttttta tcacttactt aatgttatat cttggatatt 4020
gtattaccct gggtattaaa aagaactcct ttcacatttt aaaat 4065

<210> 112
<211> 1492
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1487)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1491)
<223> n equals a,t,g, or c

<400> 112
atctctgnct cgtatccgcc ttgcctccac aagtgctggg attacaggtg tgagccacca 60
cacccggcct atattgtttt gaaagcatac tctatatata gttaygggca gaggcacagg 120
catcctcagc agctgattca ggagatgatg gtaaagctag ctaactatga attaaacatt 180
cacatatcca gtctacctgg tccagtaata atacaagcaa atcttgtatt tcaggaacaa 240
atcaaggttc tcttaatttt ttggcttata tacaatgaag taaaaacttg ataaacatgg 300
tttcaaattg aggaggagag tcttggatgt atgttttaat atgtatacct tataattctg 360
cctctagcca aatgctatgt ttgcaaaatg tggcatctgt tagtttttat tgtctgtgtc 420
ttctttgttt actatacctt gggtaatttt gtgttaccaa aaaaaaaaaa aaaaggaagt 480
gtaatgtcag acacacaaga aaagcaaatc agtgttgtaa gcttaaagta caatttcaaa 540
ggtcattacc aacagcaggg ttttttttat actttaaaaa cattatgcta catatcattg 600
ccattttcat atttggggt tttgctactc ttatacaatg gaatcaatgg aaatgtcatc 660
cagccactga attgccatta ttatatctaa aaagtttcta agatgacagt tatcactatt 720

ttgttttatc tccatgctga catttgaaag aaggtactag tatccctcta gccagattgc 780
ttagtttttc gttggtaatc aaacaacagt tgtactaaag gaaagtaaag ctaggaccta 840
aatcagaatc atagttgcct gcatatatgg taacaaggtc gtgtgcattt gctttcacag 900
tgatgagtga gaggatgaga agaaattatt tgacattttt ctgtggttga atagaagaca 960
cctttctttt gtctttaggt ttaggaggag atactaagat actggatgtt tatcctatct 1020
tagtttggtt ggagtaataa gagagaagaa gagggtggac tttggctttt cagtgttttt 1080
tcccctaaag agtgatattg ctgacgtttc tatcaatttt acacataata tgtggctatg 1140
aaaccatata tctcacttaa gtaacaaagt aatcactttg tctatcacta agtaatagac 1200
aaaaatcatt gtctattatt taaagccaac aaaacagtgt aacagtttta agttcaataa 1260
tgttaagtat tgtatagaaa tatattggag gcaaagttca gttgatgaca attgtgtata 1320
tgttactgat gctgtaaatt atttttaata aagaaaattg tattatcaaa aaaaaaaaaa 1380
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1440
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaggg gggcccnttt na 1492

<210> 113
<211> 1482
<212> DNA
<213> Homo sapiens

<400> 113
attttttttt tttttttttt tttttaagct caaattttta ttaaccttgg aacaaatgca 60
ataattcctt acagtcatat agcattttac aattctgaaa gaattttcac atataccaat 120
tgaaccctca caacagccct gtgaggtagg cagggtaggt gttactttcc tactgctagt 180
gaggagaaca aggctaagag gtgaagtaag gtcacacagt tggtaaatga tggagctagg 240
actagaacct aggccttctg acttgctgcc tccctgagaa cattcaagta ataatatcct 300
atgctatata atgaatattt atctcctatg atgttgatca ggtctatttt tatacatttt 360
acctgttttt atattacctt tccctaatac tgaaaaacac taaaactgat acgagacatt 420
tgagacattt cttctctgtt actggacttt cttagatata tcaaacacta tcctaagatg 480
aaacttctgt tttgaggatc cttggctata aattctcaat tatgatacga acatttattt 540
tacaaattct acaaaagtat gttgaactta agaaaaacaa aacaggtgtg tttatattct 600
caaaagcttt gccatctttc ccaatatgac tttaatatgt gtataaatgg aaaacaggga 660
aaggtgttca gcaacattac agtattattg ggaaacctat gcagagtgca cataaatgca 720
agttacatca cattaatttg ttttctttgt tggccttata gaggatgaac cattagtgtc 780
tttcaggttt gatcctgtct tatatgtgac atcctcagca acaagctaaa atgatctgaa 840
ttataccaat agcggggctc aagcagcagt gatcaaaaca taatatgtat gtggtaaaaa 900
ggaacacttg ttcttcagtg gttttgccta ggtccagtgt aattacttat caaaacatgt 960
tttaagctac agcatctctg ttaaatttag aaatgtgaaa catggaagag ttatcaactt 1020
ggaatacaat actaaaactg aatataactg acccaaaact acctgtcaaa agcacagtaa 1080
agcttaacag gcataaaaac taaggggtaa aacccaactg ctctgacata agagtgaaaa 1140
acagcaaatg caaaccatca ggttaaagtg aatcacaaaa cattaggcat gtagagcatg 1200
ttttaaaaat aggaaaatga cactgagctg tattaccagg aataatattt ttaaaattcc 1260
aggtatggcc ttctacattt aatagcaatg gagagaaaca agcctatggg ggaggtgcag 1320
aaaatgaatg ggatctagaa agggagttga gtttggaagt taaggaagtc aaagaaacaa 1380
atacatccaa aatggattta gaatctctcc tctaaatcca tcctttccaa aaaatgtttc 1440
ctatattgag agatttggta aaaaaaaaaa aaaaaaagtc ga 1482

<210> 114
<211> 3731
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (652)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3730)
<223> n equals a,t,g, or c

<400> 114
aaaaacttag tttagggtga cacgtataga aggtacgccg tgcaggtacc ggtccggaat 60
tcccgggtcg acccacgcgt ccggagctcc atccccgcct cccccgccag ccgacccggc 120
tccttcacct tcccgggggа cagcgactcc ctccagcggc agacaccccg ccacgcggmc 180
cctggcaagg atactgaccg catgagcacg tgctcctcgg ccagcgagca gtccgtgcag 240
tccacccaga gcaacgggag tgaaagcagc agcagtagca acatctccac catgttggtg 300
acacacgatt acacggcagt raaggaggat gagatcaacg tctaccaagg agaggtcgtt 360
caaattctgg ccagcaacca gcagaacatg tttctggtgt tccgagccgc cactgaccag 420
tgccccgcag ctgagggctg gattccaggc tttgtcctgg gccacaccag tgcagtcatc 480
gtggagaacc cggacgggac tctcaagaag tcaacatctt ggcacacagc actccgttta 540
aggaaaaaat ctgagaaaaa agataaagac ggcaaaaggg aaggcaagtt agagaacggt 600
tatcggaagt cacgggaagg actcagcaac aaggtatctg tgaaagcttc tncaatccca 660
actacattta tgaacgttcc ccccagaatt cgtcattcca ttgagtgagg tcacgtgtga 720
gacaggggag accgttgttc ttagatgtcg agtctgtggc cgccccaaag cctcaattac 780
ctggaagggc cctgaacaca acaccttgaa caacgatggt cactacagca tctcctacag 840
tgacctggga gaggccacgc tgaagattgt gggcgtgacc acggaagatg acggcatcta 900
cacgtgyatc gctgtcaatg acatgggttc agcctcatcg tcggccagcc tgagggtcct 960
aggtccaggg atggatggga tcatggtgac ctggaaagac aactttgact ccttctacag 1020
tgaagtggct gagcttggca ggggcagatt ctctgtcgtt aagaaatgtg atcagaaagg 1080
aaccaagcga gcagtggcca ctaagtttgt gaacaagaag ttgatgaagc gcgaccaggt 1140
cacccatgag cttggcatcc tgcagagcct ccagcacccc ctgcttgtcg gcctcctcga 1200
cacctttgag accccccacca gctacatcct ggtcttagaa atggctgacc agggtcgcct 1260
cctggactgc gtggtgcgat ggggaagcct cactgaaggg aagatcaggg cgcacctggg 1320
ggaggttctg gaagctgtcc ggtacctgca caactgcagg atagcacacc tggacctaaa 1380
gcctgagaat atcctggtgg atgagagttt agccaagcca accatcaaac tggctgactt 1440
tggagatgct gttcagctca acacgaccta ctacatccac cagttactgg ggaaccctga 1500
attcgcagcc cctgaaatca tcctcgggaa ccctgtctcc ctgacctcgg atacgtggag 1560
tgttggagtg ctcacatacg tacttcttag tggcgtgtcc cccttcctgg atgacagtgt 1620
ggaagagacc tgcctgaaca tttgccgctt agactttagc ttcccagatg actactttaa 1680
aggagtgagc cagaaggcca aggagttcgt gtgcttctcc tgcaggagga ccccgccaag 1740
cgtccctcgg ctgcgctggc cctccaggag cagtggctgc aggccggcaa cggcagaaag 1800
cacgggcgtc ctcgacacgt ccagactgac ttccttcatt gagcggcgca aacaccagaa 1860
tgatgttcga cctatccgta gcattaaaaa ctttctgcag agcaggcttc tgcctagagt 1920
ttgacctatc cagaagttct ttctcattct ctttcacctg ccaatcagct gttaatctga 1980
attttcaaga gaaaacaagc aaacataact gatcagctgc cggtatgttc atcgtgtgaa 2040
attgcattcc aagtgagctg tgctcagcag tgcttggaca cagagctgca agctgcgctg 2100
gggtggagga ccgtcactta cactctkccc aaggcagagg tcgcattgct gtatcacagt 2160
attttattca ggtttctgca aaaaaataaa aagataactt ttttaaacaa acatgaatag 2220
aattttgcaa atttaacgtt ttcaagattt attcaaggaa acaaaatgcc tatgttcaac 2280
cactggtgtt aatgaacaaa gatactgtgc gtctctgggg aagacgcacc taggtggcgg 2340
ccactcccat ggccttgtct aggactcaga gaccactcgg ctctgagctt ccaggcgcct 2400

cgtctgtgtg catctcacgc ccgacgtggc ttctgaaacg tgcattcaac ctcaaacttt 2460
tgcataaaat agaatgaatc gttttgctct gatgaaatgt aggccttact tgtatataag 2520
actgttcctg ccttcggtct gtcattttcc cacctgcctc ccctacccac cccccaccca 2580
ccacctgggg cttcctctgg gggtccgagg gtcttcccat cacatgaaga catcaggttg 2640
ggtcctgccc cactgcccct ccccctgttc ctgccccaag ccgtcaatca gattgtggag 2700
cagtacacag tcagatgaaa atactgtaaa tgcactcatt gggggttttt tggttttact 2760
tcatatcatg tgcaatgttg tggctttaac attttatgca actatttatg aagacctctg 2820
ttgtacctgt aataaatata tagaaaaagc acatacttcg tatggtgagc tttatggttt 2880
tgtgtgtgtg ttggggttgg cgggtgggtg ggtagggtcg tagccctgtg ccatcggttc 2940
aaagagactt ttcgtgaaat ttgttggttt tgaggactgt aaaagtgatt tcatactctg 3000
aatataaaac tggataatag ggtaatgttt taaaatttat tatgctatta ttcagaatgc 3060
caaagtatta ttttttttcc caaaatcagt ctggacattt actacttttt agacttttg 3120
acgttgaact ttctgtataa aaattggctg ggttttgagc ttttggtaag aaataaaagc 3180
cgattaagca ctggccgccc cgcggctggt acccaatgcc cgagtcactg tggcagcatt 3240
cgcactggtg tggggagtcc tttcaactca aggaggctgg gtttctgggc accctcgaag 3300
ttttctggat gtctttttat ctttctcgtg tgaactgcac tacaaaagag accagcccgc 3360
ttcccaagcc agccagacac ctgggtcttg agccataaac tggcgtagtt aagctttgca 3420
gcttccagtg tattttattt attcttttgt tgggtttttg tttgtttctt cttgtaaaat 3480
tgtacagaaa ctttttaaaa gaaattggat tcgaaactgg atgtgtattc gtaacctcat 3540
aatttttatt tgtgtattgt ttcttttatt atttcagtta aatttttaca ttattttgca 3600
tgtatatttc tttgtacaga gaccttacat gtttacacag tatgatgtga tgtaaatatt 3660
ttattttgcc atcagttatt ttaaaaaatt aaacatattt gcctgaaaaa aaaaaaaaaa 3720
ggggggcgcn c 3731

<210> 115
<211> 1315
<212> DNA
<213> Homo sapiens

<400> 115
ggcggcagcg ccggaaagga ggccaagagc gcgggcggcg aggcaagatg gcggcaacca 60
agaggaaacg gcgtggaggc tttgcagttc aggcgaagaa gccaaaaaga aacgaaatag 120
atgcggagcc gccagctaag cggcacgcca cagcagagga ggtggaggaa gaagagaggg 180
accggatccc aggccccgtt tgcaagggaa agtggaaaaa taaggaacgg attctcatct 240
tttcttccag aggaataaat tttagaacaa gacatttaat gcaggacttg agaatgttga 300
tgcctcattc taaagcagat actaaaatgg atcgtaagga taagctattt gtgattaacg 360
aggtttgtga aatgaagaac tgtaataaat gcatctattt tgaagctaag aaaaaacagg 420
atctctatat gtggctttca aattcacctc acggaccatc tgctaaattc cttgttcaaa 480
atattcatac cctcgctgaa ctgaagatga ctggaaactg tttgaaaggt tctcggcccc 540
ttttgtcttt tgaccctgct tttgatgaat taccacatta tgctttgkta aaagaactct 600
taattcagat ctttagtaca ccacggtatc atcccaaaag ccaaccattt gtggaccacg 660
tgtttacttt caccattttg gataatagga tatggtttcg gaactttcag atcatagaag 720
aagatgctgc tcttgtagaa ataggacctc gttttgtctt aaatctcata aagattttcc 780
agggaagttt tggaggacca actttatatg aaaatcctca ctaccagtca ccaaacatgc 840
atcggcgtgt cataagatcc atcacagctg caaaatacag agagaaacag caagtgaaag 900
atgtgcaaaa actgagaaag aaagagccga agactcttct tccacatgat cccactgcag 960
atgtttttgt aacaccagct gaggagaaac caatagaaat acagtgggta aaaccagagc 1020
caaaagttga tttgaaagca agaaagaaac ggatttacaa aaggcaaaga aaaatgaaac 1080
agaggatgga cagtgggaaa acaaaataag tcaatggaaa cctgatttgt ttttcagtta 1140
ctttatattt attttgtatt caatgtgtaa atacttttat tatctaatac tatcttacgt 1200
ctaattagtg tagcatttac aagaaagaaa aattaagatc ttaaaatcag tgattatctt 1260

tttctaaata aaatatcacc agaattcatc agttaaaaaa aaaaaaaaaa aaaaa 1315

<210> 116
<211> 1320
<212> DNA
<213> Homo sapiens

<400> 116
ggctggcttc tgcgtggtgc agctgcgcac gtgtttcagc cggcagcgct ttaagatttc 60
cggggatgga atccgaaatg gaaacgcaga gcgccrgggc agaggagggc tttacccagg 120
tcacccgcaa gggtggccga cgggcgaaga aacgacaggc tgaacagctg tccgcagcag 180
gagagggcgg ggatgcgggc cgcatggaca cagaggaggc caggccggcg aagaggcccg 240
tcttcccacc cctctgtggg gacgggctcc tgagtgggaa agaagaaaca aggaaaattc 300
cagtcccagc taacagatac acaccattga aagaaaactg gatgaagata tttactccta 360
ttgtggaaca tttgggactt cagatacgct ttaacttgaa atcaaggaat gtagaaatca 420
ggacttgtaa rgaaaccaag gatgttagtg ctctgacaaa agcagctgat tttgtgaaag 480
cttttattct cggctttcag gtggaggatg cacttgccct catcaggttg gatgacctct 540
tcctagagtc ttttgaaatt acagatgtta aacccctaaa gggagaccat ctatccaggg 600
caataggaag aatcgctggc aaaggaggaa aaaccaaatt caccatagag aatgtgacac 660
ggacaaggat agttttggct gatgtgaaag ttcacatcct tggctccttc caaaatatca 720
agatggcaag aactgccatt tgcaacctaa tcttgggaaa tcctccttcc aaggtttatg 780
gcaatattcg agctgtggct agcagatcag cagatcgatt ctgatttcaa gtcagagact 840
ttttatcttg cctttggact ctggtgaaaa atactttaca gtggtcggtc acaagaaacc 900
atctgaacaa tttcagtcat ttgaagcctc cgtcccttct tccattctca gccagaagca 960
taaacagaaa agaaagattt aagaggattc acactcaaca ggttttagga taatttaaat 1020
atcaaaaatt gattgttata cttacacatt aggtataatt tatcatttat ctgaaatcac 1080
atgtagcaga ttgcatagtc tgtaatcctc tcagagggaa acttcttgtt taaacagctc 1140
tatatggatt tatactttta tatttataaa tttataactt catacaaatt tataaacatt 1200
tctttataaa ttgtaattta atagattatc tcagaaaaac ctctctgaat gatgaccctt 1260
ccttaatact gggtgatgtg tgaatatttg tttgttggca gacagggtct cactttgtca 1320

<210> 117
<211> 2025
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1916)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1944)
<223> n equals a,t,g, or c

<400> 117
ttattttaca gcctcaaata tttctcatta tcttgtcact tagttcttca tgtttctcct 60
tctgactttt aataatggta ataggaaaac aaaacccaaa gcttttcaga acttcagtgt 120
gaggtttcct attttracaa gttaacttgt aaatactcag gttttacgat gtataattta 180
cctaatagac caaactaact catggagata ttttgaacta ttatttaggt acaaacttta 240
taaagaatgt tagtatgtca taaaatataa cattacagct tatttaaaac caaatatagt 300
tgaacatatt taaaatacat tttcacagaa tggatgaatt agttgtttct tcagagttac 360
ttatgaacag ttgaatgctt taaaatgttc tgtctgtagg taacatctaa aacacaagtg 420
ggtttattta aatttttaaa atttgaaatt ttttatttgc aaaaaattgt tttatgcttt 480
attatatcgc aaatgagtgt cagatttttg agtaccaatg atcatgcttc cattttttttt 540
agttttaaac caccaaacca atatttttcc tttaaatttt aatcttataa tatagaaatc 600
ttatgtaaat gaaattttgt catgtttcaa ataaagagaa ctgaagtaga aaatagaaat 660
gccagtaaac aacataatgt ttaatttaca acttacatta ggggtttggg ggaatgctaa 720
ttatatattg agaatataca ttagaactct tcaaaatggg ctcttctaat gaggtcacta 780
ctgaacaaaa ttgttccctc ttctgttaaa tagaataggt ttaaatgact agtcaaatga 840
attattttct tcttgttaaa taaattaaat cttactttct tttaatgacc aaccttaggt 900
aaaacaaaaa tattgtaatc ctagaaatta tcctccagct ttctcacctg aaaatctatt 960
gaagtgatcc ctggtcatcc taataatggg atgagggaag tttccagcag atttcaggct 1020
gttcttaaag tttttgttgg tcattttctc aatagtacat gaaatcaaga tgcttatgag 1080
catggaaatg tatttaaagt ttttgcttgt gtcctcctca gtcagaatag aaaagtaact 1140
gaaatactct tacctttctg tccttgataa aatagtaaag aaaaccaaac aaacccaggc 1200
ctgatgggaa aaatgattcc tttattctag caacttactt tctgttggta tgggaaatgt 1260
tattaatttc tattactaaa gttcatatca caaaatgata tttaataata accttggggt 1320
aaatcatgaa ttttttttnc tacgtgtgag tataaaagac aaaagttgaa cagcatggaa 1380
tctcattgcc aaattattag tgaatgtata gttcaggtat tctttgagac acacagtatc 1440
attaatttcc gaattgtatt tcagtgttat tttttgtttg tgaccactaa gcttctgtct 1500
taatacaaag ctgttacctt ctacagaatt taagtctgaa gatgtaaaga gagaacaggc 1560
cttgtgtaac agaagatact ctttttttatg ctccttactg tgatcacaga aaaattaaaa 1620
atccaagtgc tctctagatt tgttgataaa cattttatgc ttgcatttaa acttgaaatg 1680
tatgagcaga atgagacaat cagttaaatc agaaatgaga agtattataa tgtaaaggcc 1740
ttgttttgct gtagcaataa aatgaccaag tgcaatgact tgatttaata aaatcatatt 1800
ttaaaagtgc tgstatgaaw atttttggct ataaaatttt accctgactt gstttcaata 1860
actgttacgt aatgcagttt gatgttgtaa cctaacattc caaaaaaaaa attganaggg 1920
ggaatctcaa aatagtatat actncactaa cttgtttaca ggtgctgtat ttaaaagcat 1980
gcttctctct caaaaagaaa aattaaagga ttttattgcc aaacc 2025

<210> 118
<211> 1295
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1292)
<223> n equals a,t,g, or c

<400> 118
ggcacgaggt gcagttacac gttttcctcc aaggagcctc ggacgttgtc acgggtttgg 60
ggtcggggac agagcggtga ccatggccag gctggcgttg tctcctgtgc ccagccactg 120
gatggtggcg ttgctgctgc tgctctcagc agctgagcca gtaccagcag ccagatcgga 180
ggaccggtac cggaatccca aaggtagtgc ttgttcgcgg atctggcaga gcccacgttt 240
catagccagg aaacggggct tcacggtgaa aatgcactgc tacatgaaca gcgcctccgg 300
caatgtgagc tggctctgga agcaggagat ggacgagaat ccccagcagc tgaagctgga 360
aaagggccgc atggaagagt cccagaacga atctctcgcc accctcacca tccaaggcat 420
ccggtttgag gacaatggca tctacttctg ccagcagaag tgcaacaaca cctcggaggt 480
ctaccagggc tgcggcacag agctgcgagt catgggattc agcaccttgg cwcagctgaa 540
gcagaggaac acgctgaagg atggtatcat catgatccag acgctgctga tcatcctctt 600
catcatcgtg cctatcttcc tgctgctgga caaggatgac agcaaggctg gcatggagga 660
agatcacacc twcgagggcc tggacattga ccagacagcc acctatgagg acatagtgac 720
gctgcggaca ggggaagtga agtggtctgt aggtgagcac ccaggccagg agtgagagcc 780
aggtcgcccc atgacctggg tgcaggctcc ctggcctcag tgactgcttc ggagctgcct 840
ggctcatggc ccaacccctt tccyggaccc cccagctggc ctctgaagct ggcccaccag 900
agctgccatt tgtctccagc ccctggtccc cagctcttgc caaagggcct ggagtagaag 960
gacaacaggg cagcaacttg gagggagttc tctggggatg gacgggaccc agccttctgg 1020
gggtgctatg aggtgatccg tccccacaca tgggatgggg gaggcagaga ctggtccaga 1080
gcccgcaaat ggactcggag cygagggcct cccagcagag cttgggaagg gccatggacc 1140
caactgggcc ccagaagagc cacaggaaca tcattcctct cccgcaacca ctcccacccc 1200
agggagccct ggcctccagt gccttccccc gtggaataaa cggtgtgtcc tgagaaacca 1260
maaaaaaaaa aaaaaaaaaa aaaaangggg gnccc 1295

<210> 119
<211> 1257
<212> DNA
<213> Homo sapiens

<400> 119
tggacagacc tcagcaacac agcaatgtgc actttgtagt aaagaaatac caacttgagt 60
ttttaaaaaa cctagttagt cctacattcc cttttcttta aaaaaacttt attgttcaca 120
ttattttaat gactatgaga taatgtatat gacagcactt tgagaaaata tcaactgtaa 180
tataactata aggttgtagt attgtctgtt taaaagataa gacagttgat tcaatgtgga 240
tggaccctgt ggggtacctg aaaatgtaga tacgtaagaa tcacctctgt catttatcac 300
atttagaaat atgaaactgc ttaacaggta tgagcaggta tagcaagtgt ttgctaaagt 360
tgtagttcag agctgaatta cttcaggaaa ctagggacca actttttggt ttaattccga 420
tctttaaaaa gtaagaatgt gtactcactc cagaacacag aagctcttcc aaggaccttg 480
actcaagaag gatgaggtcc tcttactctt ctccatttat ccactatatg cttggccatt 540
tatcctaaat gtggtgggaa cagacttgtt atctgttgat gttgacagtg tctttttttaa 600
cctatgtcct gcatagtttt gttaggttta caggggggagg tggatggcca taaaaccagt 660
gcactttggg aattactttt ctaggatttc ctaccagtta taaatgacat tgacatttgt 720
catctttttt ttctttttct aaaaagaata gctgaattta attcacctat tataaaatac 780
tcaaaagtaa attgcmttgg tggccacttc tgaattatag ctacatttca ttatgacccc 840
ttctgctcwc ttccattttg ctactgatgt cattcttgtt atcaggctgt gcccctacca 900
ggagttcata ttgggttgac agggttatct atatttttgt tcttgatttt tgagttttat 960
catcttgcat taaattgttc cacctggatt tggggttcat ctctgtgccc taaggatctg 1020
ctatgaccaa tcctcttttt gtaggtgggt ctctggctta agtattgata ggcttcagcg 1080
gtttgtgtct ctgtcttagc ttgtatcaag ccagtagtag ctcacttcct ttgtaaattc 1140
ctgcttcagt ctgggatccg taggagtatg tgagaacttc tgaaacgtct ccaactctta 1200
acagtcaaga tatctatatc atttggawag agttctggkt ttccaactac taagacc 1257

<210> 120
<211> 397
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (395)
<223> n equals a,t,g, or c

<400> 120
ccccaggaaa ataccaaacc taggtttaaa aatagggaag ggaagggaga gaagaaaggg 60
aagataaaga aagcccaacc tccttccaaa atgtcatgag aatcttgagc acatatggtc 120
cttggcatga ccacatgacc tgcagagccc ctgttataga actcattttt atattttcct 180
tagtataaca gttaatataa tatgtcattt ttgttaatag tgtctttttg tcattttact 240
ttttaaaaga ttttattgaa atatacatac aggaaagtgc atctatcata agtgtgccaa 300
attgatggaa ttctaaaatc tttantggta cctgtttagc acatagattg gacacggaac 360
ataactaaca accagaantc tccgtgtact ccctncc 397

<210> 121
<211> 876
<212> DNA
<213> Homo sapiens

<400> 121
cccacgcgtc cgggaagtgc ttactcgtcg tctccatgcg ccggttcctg ggcgtcttag 60
agccaaggcg cgaggctcgg agtgagaggt agagctggag gggaccctaa gcgccctccg 120
cccgggacgt gagccgctgc gcccaccggg ctagacccgg cgccatcatg ctgcttctgc 180
caagcgccgc ggacggccgg ggcaccgcca tcacccacgc tctgacctct gcctctacac 240
tctgtcaagt tgaacctgtg ggaagatggt ttgaagcttt tgttaagagg agaaacagaa 300
atgcttctgc ctcttttcag gaactggagg ataagaaaga gttatccgag gaatcagaag 360
atgaagaatt gcagttggaa gagtttccca tgctgaaaac acttgatccc aaagactgga 420
agaaccaaga tcattatgca gttcttggac ttggccatgt gagatacaag gctacacaga 480
gacagatcaa agcagctcat aaagcaatgg ttttaaaaca tcacccagac aaacggaaag 540
cagctggtga accaataaaa gaaggagata atgactactt cacttgcata actaaagctt 600
atgaaatgtt atctgatcca gtgaaaagac gagcatttaa cagtgtagat cctacttttg 660
ataactcagt tccttctaaa agtgaagcaa aggataattt cttcgaagtg tttacccccag 720
tgtttgaaag gaattccaga tggtcaaata aaaaaaatgt tcctaaactt ggtgatatga 780
attcatcatt tgaagatgta gatatatttt attctttctg gtataatttt gattcttgga 840
gagaattttc ttatttagat gaagaagaaa aaaaaa 876

<210> 122
<211> 1278
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (107)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (128)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (149)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1228)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1231)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1269)
<223> n equals a,t,g, or c

<400> 122
ccaggaaggc ctttggaatg caaacatttt tggtccccat cgaaatgttc gaaagactaa 60
ggaagataaa aagagttgac gggcgccgac ctgaaggact gcgtcanaca acagcctgag 120
cagcaatnca gcctccccag cgtgcaganc tgccggcgcc tgcgtgagag gagggtcgcc 180
agctgggccg tgtcctttga gcgcctgctg caggaccccg tcggtgtccg ctacttctct 240
gattttctaa ggaaagaatt cagtgaagaa aacattttat tctggcaggc ctgtgaatat 300
tttaatcatg ttcctgcaca tgacaaaaag gagctttcct acagggcccg ggagattttc 360
agtaagtttc tctgcagcaa agccaccacc ccggtcaaca tcgacagcca ggcccagcta 420
gcagacgacg tcctccgcgc acctcaccca gacatgttca aggagcagca gctscagatc 480
ttcaatctca tgaagtttga tagctacact cgctttctga agtccccgct gtaccaggga 540

atgcatcctg ggcggaagtg gagggccgtg cactcccgga ctcgcagcag gtccccagca 600
gcccggcttc caagcacagc ctcggttcag accactccag tgtgtccacg ccaaaaaagt 660
taagtggaaa atcaaaatcc ggccgatccc ttgaatgaag agctggggga tgaggacagc 720
gagaagaagc ggaaaggcgc gtttttctcg tggtcgcgga ccaggagcac cgggaggtcc 780
cagaaaaaga gggagcacgg ggaccacgca gacgacgccc tgcatgccaa tggaggcctg 840
tgtcgccgag agtcgcaggg ctctgtgtcc tctgcgggga gcctggacct gtcggaggcc 900
tgcaggactt tggcacccga gaaggacaag gccaccaagc actgctgcat tcatctcccg 960
gatgggacat cctgcgtggt ggctgtcaag gcgggcttct ccatcaaaga catcctgtcc 1020
ggactctgtg agcggcatgg catcaacggg gcggccgcgg acctcttcct ggtgggcggg 1080
gacaagcctc tggtgcttgc accaagacag tagcatcttg ggagtcaagg gacctgcgcc 1140
ttaggaaaag cggcaccttt gttttcgggt tggatctttg tttccgattt aaccggttca 1200
tggggattca aggccaagcc caccaagncc nttacggagg tgctgcggcc ctggtggcca 1260
gntacggcnt ggactcat 1278

<210> 123
<211> 3115
<212> DNA
<213> Homo sapiens

<400> 123
ggcacgagcg cgggcagcga gcgcactcgg cggacgcaag ggcggcgggg agcacacgga 60
gcactgcagg cgccgggttg ggacagcgtc ttcgctgctg ctggatagtc gtgttttcgg 120
ggatcgagga tactcaccag aaaccgaaaa tgccgaaacc aatcaatgtc cgagttacca 180
ccatggatgc agagctggag tttgcaatcc agccaaatac aactggaaaa cagcttttgg 240
atcaggtggt aaagactatc ggcctccggg aagtgtggta ctttggcctc cactatgtgg 300
ataataaagg atttcctacc tggctgaagc tggataagaa ggtgtctgcc caggaggtca 360
ggaaggagaa tcccctccag ttcaagttcc gggccaagtt ctaccctgaa gatgtggctg 420
aggagctcat ccaggacatc acccagaaac ttttcttcct ccaagtgaag gaaggaatcc 480
ttagcgatga gatctactgc ccccctgaga ctgccgtgct cttggggtcc tacgctgtgc 540
aggccaagtt tggggactac aacaaagaag tgcacaagtc tgggtacctc agctctgagc 600
ggctgatccc tcaaagagtg atggaccagc acaaacttac cagggaccag tgggaggacc 660
ggatccaggt gtggcatgcg gaacaccgtg ggatgctcaa agataatgct atgttggaat 720
acctgaagat tgctcaggac ctggaaatgt atggaatcaa ctatttcgag ataaaaaaca 780
agaaaggaac agacctttgg cttggagttg atgcccttgg actgaatatt tatgagaaag 840
atgataagtt aaccccaaag attggctttc cttggagtga aatcaggaac atctctttca 900
atgacaaaaa gtttgtcatt aaacccatcg acaagaaggc acctgacttt gtgttttatg 960
ccccacgtct gagaatcaac aagcggatcc tgcagctctg catgggcaac catgagttgt 1020
atatgcgccg caggaagcct gacaccatcg aggtgcagca gatgaaggcc caggcccggg 1080
aggagaagca tcagaagcag ctggagcggc aacagctgga aacagagaag aaaaggagag 1140
aaaccgtgga gagagagaaa gagcagatga tgcgcgagaa ggaggagttg atgctgcggc 1200
tgcaggacta tgaggagaag acaaagaagg cagagagaga gctctcggag cagattcaga 1260
gggccctgca gctggaggag gagaggaagc gggcacagga ggaggccgag cgcctagagg 1320
ctgaccgtat ggctgcactg cgggctaagg aggagctgga gagacaggcg gtggatcaga 1380
taaagagcca ggagcagctg gctgcggagc ttgcagaata cactgccaag attgccctcc 1440
tggaagaggc gcggaggcgc aaggaggatg aagttgaaga gtggcagcac agggccaaag 1500
aagcccagga tgacctggtg aagaccaagg aggagctgca cctggtgatg acagcacccc 1560
cgcccccacc acccccccgtg tacgagccgg tgagctacca tgtccaggag agcttgcagg 1620
atgagggcgc agagcccacg ggctacagcg cggagctgtc tagtgagggc atccgggatg 1680
accgcaatga ggagaagcgc atcactgagg cagagaagaa cgagcgtgtg cagcggcagc 1740
tgctgacgct gagcagcgag ctgtcccagg cccgagatga gaataagagg acccacaatg 1800
acatcatcca caacgagaac atgaggcaag gccgggacaa gtacaagacg ctgcggcaga 1860

tccggcaggg caacaccaag cagcgcatcg acgagttcga ggccctgtaa cagccaggcc 1920
aggaccaagg gcagaggggt gctcatagcg ggcgctgcca gccccgccac gcttgtcttt 1980
agtgctccaa gtctaggaac tccctcagat cccagttcct ttagaaagca gttacccaac 2040
agaaacattc tgggctggga accagggagg cgccctggtt tgttttcccc agttgtaata 2100
gtgccaagca ggcctgattc tcgcgattat tctcgaatca cctcctgtgt tgtgctggga 2160
gcaggactga ttgaattacg gaaaatgcct gtaaagtctg agtaagaaac ttcatgctgg 2220
cctgtgtgat acaagagtca gcatcattaa aggaaacgtg gcaggacttc catctgtgcc 2280
atacttgttc tgtattcgaa atgagctcaa attgattttt taatttctat gaaggatcca 2340
tctttgtata tttacatgct tagaggggtg aaaattattt tggaaattga gtctgaagca 2400
ctctcgcaca cacagtgatt ccctcctccc gtcactccac gcagctggca gagagcacag 2460
tgatcaccag cgtgagtggt ggaggaggac acttggatat ttttttagtt tttttttttt 2520
tggcttaaca gttttagaat acattgtact tatacacctt attaatgatc agctatatac 2580
tatttatata caagtgataa tacagatttg taacattagt tttaaaaagg gaaagttttg 2640
ttctgtatat tttgttacct tttacagaat aaaagaatta catatgaaaa accctctaaa 2700
ccatggcact tgatgtgatg tggcaggagg gcagtggtgg agctggacct gcctgctgca 2760
gtcacgtgta aacaggatta ttattagtgt tttatgcatg taatggacta tgcacacttt 2820
taattttgtc agattcacac atgccactat gagctttcag actccagctg tgaagagact 2880
ctgtttgctt gtgtttgttt ggcagtctct ctctgccatg gccttggcag gctgctggaa 2940
ggcagcttgt ggaggccgtt ggttccgccc actcattcct tctcgtgcac tgctttctcc 3000
ttcacagcta agatgccatg tgcaggtgga ttccatgccg cagacatgaa ataaaagctt 3060
tgcaaaggca aaaaaaaaaa aaaaaraaaa maaaaaaaaa maaaraaaaa aaaaa 3115

<210> 124
<211> 379
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (340)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<400> 124
atgaatcggg ttattgaaga agatggaacc agtgcttaat ttgtcttgtc taaggtggaa 60
atcttgtgct gtttaaaaag cagattttat tctttgcctt ttgcatgact gatagctgta 120
actcacagtt aacatgcttt cagtcaagta cagattgtgt ccactggaaa ggtaaatgat 180
tgcttttta tattgcatca aacttggaac atcaaggcat ccaaaacact aagaattcta 240
tcatcacaaa aataattcgt ctttctaggt tatgaagaga taattatttg kctggtaagc 300
atttttataa acccacycat tttatattta graaaatccn aaangggtgg gggacgccct 360
tgtagngacc ttccaatac 379

<210> 125
<211> 1267
<212> DNA
<213> Homo sapiens

<400> 125
ggcacagttg aggctggtga ctgtggccgg ctgggagtag gcggcagtga gtttccctgg 60
gagggcagcg cgcttggcgc ttctcccctc cccccgatct gcctccagtc tcggacttgg 120
ttgttgcgcg ctccggctcc ggctgagctg ggagagttgg aggaggtggc ggcgggcaga 180
ggtgatgtct gggagccctt ccttgacagc ccgggccgag aagagtccct gcaggaagca 240
tcacccaggc tggcagatca tggtagcagc agcgggggtg gctgggaagt gaaacggagc 300
cagcggctga ggagggggccc cagcagcccc cgaaggccct atcaggacat ggagtatgaa 360
agacgtggtg gtcgtggtga caggactggc cgctatggag ccactgaccg ctcgcaggat 420
gatggtgggg agaaccgcag ccgagaccac gactaccggg acatggacta ccgttcatat 480
cctcgcgagt atggcagcca ggagggcaag catgactatg acgactcatc tgaggagcag 540
agtgcggagg attcctacga ggcctccccg ggctccgaga ctcagcgtag gcggcggcgg 600
cggcacaggc acagccccac cggcccgcca ggcttccccc gagacggcga ctatcgggac 660
caggactatc ggaccgagca agggaggagg aggaggagga rgaggatgag gaggaggagg 720
agaaggccag taacatcgtc atgctgagga tgctgccaca ggcasccact gaggatgaca 780
tccgtggcca gytgcagtcg cacggcgtgc aagcacggga rgttcggytg atgcggaaca 840
aatcttcagg tcagagccgg ggcttcgcct tcgtcgagtt tagtcacttg caggacgctc 900
acgatggatg gaagccaatc agcactccct caacatcctg ggccagaagg tgtcgatgca 960
ctacagtgac cccaagccca agatcaatga ggactggctg tgcaataagt gtggcgtcca 1020
gaacttcaaa cgcccgagaga agtgcttcaa atgtggcgtg cccaagtcag aggcagagca 1080
gaagctgccc ctcggmacga ggytggatca gcagacactg ccactgggtg kccgggagct 1140
gagccagggc ctgcttyccc tgccgcagcc ctaccaggcc cagggagtcc tggcctccca 1200
agccctgtca cagggctcgg agccaagctc agagaacgcc aatgacacca tcattttgcg 1260
caacctg 1267

<210> 126
<211> 841
<212> DNA
<213> Homo sapiens

<400> 126
gcgttacsat cgtccgtgcg caccgcccgg cgtccaggtg agtctcccat ctgcagagac 60
gcggacgcgc cggcccgcag ttggcctgcg gagcgcggtg gacggtttgg cgcccaccag 120
gcgatcaata ctttggattt ttaatttcta gatttggcaa ttcttcgctg aagtcatcat 180
gagcttttc caactcctga tgaaaaggaa ggaactcatt cccttggtgg tgttcatgac 240
tgtggcggcg ggtggagcct catctttcgc tgtgtattct ctttggaaaa ccgatgtgat 300
ccttgatcga aaaaaaaatc cagaaccttg ggaaactgtg gaccctactg tacctcaaaa 360
gcttataaca atcaaccaac aatggaaacc cattgaagag ttgcaaaatg tccaaagggt 420
gaccaaatga cgagccctcg cctctttctt ctgaagagta ctctataaat ctagtggaaa 480
catttctgca caaactagat tctggacacc agtgtgcgga aatgcttctg ctacattttt 540
agggtttgtc tacatttttt gggctctgga taaggaatta aaggagtgca gcaataactg 600
cactgtctaa aagtttgtgc ttattttctt gtaaatttga atattgcata ttgaaatttt 660
tgtttatgat ctatgaatgt ttttcttaaa atttacaaag ctttgtaaat tagattttct 720
ttaataaaat gccatttgtg caagaaaaaa aaaaaaaaaa aaagggcggc cgctctagag 780
gatccctcga ggggcccaag cttacgcgtg catgcgacgt catagctctg tccctacgaa 840
g 841

<210> 127
<211> 1172
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (119)
<223> n equals a,t,g, or c

<400> 127
tactatttat agctttagat agggcctccc ttcccctctt ctttctttgt tctctttcat 60
taaacccctt ccccagtttt tttttatact ttaaaccccg ctcctcatgg ccttggccnt 120
ttctgaagct gcttcctctt ataaaatagc ttttgccgaa acatagtttt tttttagcag 180
atcccaaaat ataatgaagg ggatggtggg atatttgtgt ctgtgttctt ataatatatt 240
attattcttc cttggttcta gaaaaataga taaatatatt tttttcagga aatagtgtgg 300
tgtttccagt ttgatgttgc tgggtggttg agtgagtgaa ttttcatgtg gctgggtggg 360
tttttgcctt tttctcttgc cctgttcctg gtgccttctg atggggctgg aatagttgag 420
gtggatggtt ctaccctttc tgccttctgt ttgggaccca gctggtgttc tttggtttgc 480
tttcttcagg ctctagggct gtgctatcca atacagtaac cacatgcggc tgtttaaagt 540
taagccaatt aaaatcacat aagattaaaa attccttcct cagttgcact aaccacgttt 600
ctagaggcgt cactgtatgt agttcatggc tactgtactg acagcgagag catgtccatc 660
tgttggacag cactattcta gagaactaaa ctggcttaac gagtcacagc ctcagctgtg 720
ctgggacgac ccttgtctcc ctgggtagga gggggggaa tgggggaggg ctgatgaggc 780
cccagctggg gcctgttgtc tgggaccctc cctctcctga gaggggaggc ctggtggctt 840
agcctgggca ggtcgtgtct cctcctgacc ccagtggctg cggtgagggg aaccaccctc 900
ccttgctgca ccagtggcca ttagctcccg tcaccactgc aacccagggt cccagctggc 960
tgggtcctct tctgcccccca gtgcccttcc ccttgggctg tgttggagtg agcacctcct 1020
ctgtaggcac ctctcacact gttgtctgtt actgattttt tttgataaaa agataataaa 1080
acctggtact ttctaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1140
aaaaagggcg gccgctcgcg atctagaact ag 1172

<210> 128
<211> 891
<212> DNA
<213> Homo sapiens

<400> 128
acccacgcgt ccgtgagatt ctctcccagg ccacaagaca tttcctgctc ggaaccttgt 60
ttactaattt ccactgcttt taaggccctg cactgaaaat gcaagctcag gcgccggtgg 120
tcgttgtgac ccaacctgga gtcggtcccg gtccggcccc ccagaactcc aactggcaga 180
caggcatgtg tgactgtttc agcgactgcg gagtctgtct ctgtggcaca ttttgtttcc 240
cgtgccttgg gtgtcaagtt gcagctgata tgaatgaatg ctgtctgtgt ggaacaagcg 300
tcgcaatgag gactctctac aggacccgat atggcatccc tggatctatt tgtgatgact 360
atatggcaac tctttgctgt cctcattgta ctctttgcca aatcaagaga gatatcaaca 420
gaaggagagc catgcgtact ttctaaaaac tgatggtgaa aagctcttac cgaagcaaca 480
aaattcagca gacacctctt cagcttgagt tcttcaccat cttttgcaac tgaaatatga 540
tggatatgct taagtacaac tgatggcatg aaaaaaatca aatttttgat ttattataaa 600
tgaatgttgt ccctgaactt agctaaatgg tgcaacttag tttctccttg ctttcatatt 660
atcgaatttc ctggcttata aactttttaa attacatttg aaatataaac caaatgaaat 720
attttactga taagattctt catgcttctt tgctctcctt aaaatgtctt tttcactagt 780

tagttccaag ggtcagtctc ataattttgt tcttatactt tgatttcctt tttcttttt 840
ttttttttta atagagttgg gggatcyttc yttctttttt tttttttttt t 891

<210> 129
<211> 2461
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1164)
<223> n equals a,t,g, or c

<400> 129
tttcaattct tggntttctg ttcccttcta ccaaaaccca gcataggact cagtgtacac 60
ttactttaaa acaaaaactc acatttctta gctgcaggtg atggcctcag tcattttaat 120
acagcctgga atgagtttgc ttattaccca gtcactttcg tagtgaatgt tcaaacccca 180
aagcaaatgt ttgcatctcc ttgtccataa aggagaaagc caggttatag gagaaagaga 240
gagaaaggcg catgtctgtt tgcacagaga gaggcaattt tgtctacctt tcgagaatca 300
gttataaaca gaagggcctc ttaggatttt gagctctcct gacaatgaag gaaaagctct 360
cttgagtata caagttccac actcattacc tttcagtggt gacccatcac ccactacaat 420
ttgttgaagg aagggagtgt cagagatatg ctttaaagtt gtactttagg ctgaaattct 480
ctctgtattt ggacctgcag atgttgtgta cagaaccgat gcatggcagg gtcaggaagc 540
taggagagtg aaggcgcttg tggagacagc tctgtagcaa atgaaacacg gaagcctccg 600
ggaatgtgtt tgtgtcacca gcagcaggca tttccctgtc ctccccaccc ccagtctcca 660
catccccagc agcctcttcc agaagcatgt cagggagacg gacaggtgct ctccttctcg 720
tgcaccacat ccaagtccac ccaccgtgga cgcagtgtga ctaaatgctg gccttgaaga 780
gaaaccctca gccagcttgt ctgttgtcca ggtccctcag tgtctctggt ttccctgccc 840
tgcataattt aagcattagt gccaaataca tctgtcatat tcctctccct ggagactgcg 900
aaatgtccag actttttcag actagtggag ggaaggaatg ttacataact aagtggaggc 960
ctggaactgt caggatttga cagggctgga ccagagaccc ttccgcctct gcctagtgtg 1020
tctgtcaggc aggcagcagc catcaatcca agaatgagcc atggcggcaa gcactktgtg 1080
gagaaaggaa cccagccgag gtctgagttt cagacagaaa ctggggagtt gggacatctt 1140
ctctgtgcca ggcttcattg acancatcgg tccttcattg asctgagccc aagccctcag 1200
tggaacctgt caagagcatc agcagcatgg agctgaagac cgagcccttt gatgacttcc 1260
tgttcccagc atcatccagg cccagtggct ctgagacagc ccgctccgtg ccagacatgg 1320
acctatctgg gtccttctat gcagcagact gggagcctct gcacagtggc tccctgggga 1380
tggggcccat ggcacagagc tggagcccct gtgcactccg gtggtcacct gtactcccag 1440
ctgcactgct tacacgtctt ccttcgtctt cacctacccc gaggctgact ccttccccag 1500
ctgtgcagct gcccaccgca agggcagcag cagcaatgag ccttcctctg actcgctcag 1560
ctcacccacg ctgctggccc tgtgaggggg cagggaaggg gaggcagccg gcacccacaa 1620
gtgccactgc ccgagctggt gcattacaga gaggagaaac acatcttccc tagagggttc 1680
ctgtagacct agggaggacc ttatctgtgc gtgaaacaca ccaggctgtg ggcctcaagg 1740
acttgaaagc atccatgtgt ggactcaagt ccttacctct tccggagatg tagcaaaacg 1800
catggagtgt gtattgttcc cagtgacact tcagagagct ggtagttagt agcatgttga 1860
gccaggcctg ggtctgtgtc tcttttctct ttctccttag tcttctcata gcattaacta 1920

atctattggg ttcattattg gaattaacct ggtgctggat attttcaaat tgtatctagt 1980
gcagctgatt ttaacaataa ctactgtgtt cctggcaata gtgtgttctg attagaaatg 2040
accaatatta tactaagaaa agatacgact ttattttctg gtagatagaa ataaatagct 2100
atatccatgt actgtagttt ttcttcaaca tcaatgttca ttgtaatgtt actgatcatg 2160
cattgttgag gtggtctgaa tgttctgaca ttaacagttt tccatgaaaa cgttttattg 2220
tgtttttaat ttatttatta agatggattc tcagatattt atatttttat tttatttttt 2280
tctaccttga ggtcttttga catgtggaaa gtgaatttga atgaaaaatt taagcattgt 2340
ttgcttattg ttccaagaca ttgtcaataa aagcatttaa gttgaatgcg aaaaaaaaaa 2400
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaagggcggc cgctcgcgat ctagaactag 2460
t 2461

<210> 130
<211> 2197
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1381)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2194)
<223> n equals a,t,g, or c

<400> 130
gacgagatct gtgtcagaac gtgcgtgtga gcggatacaa aacccgagag aggcgtgagc 60
agcgctgtgt ttgcgagcgg kagcgaggrg cgccggctgr ggtgtgtgct cctgagctct 120
tcagaaacca ggctgctttc aggaacattg ctgtggattc ccagggccta ttccactaga 180
agcaagatgg ctgaactcaa tactcatgtg aatgtcaagg aaaagatcta tgcagttaga 240
tcagttgttc ccaacaaaag caataatgaa atagtcctgg tgctccaaca gtttgatttt 300
aatgtggata aagccgtgca agcctttgtg gatggcagtg caattcaagt tctaaaagaa 360
tggaatatga caggaaaaaa gaagaacaat aaaagaaaaa gaagcaagtc caagcagcat 420
caaggcaaca aagatgctaa agacaaggtg gagaggcctg aggcagggcc cctgcagccg 480
cagccaccac agattcaaaa cggccccatg aatggctgcg agaaggacag ctcgtccaca 540
gattctgcta acgaaaaacc agcccttatc cctcgtgaga aaaagatctc gatacttgag 600
gaaccttcaa aggcacttcg tggggtcaca ggcccaaata ttgagaaatc agtgaaggat 660
ttgcaacgct gcaccgtttc tctaactaga tatcgcgtca tgattaagga agaagtggat 720
agttccgtga agaagatcaa agctgccttt gctgaattac acaactgcat cattgacaaa 780
gaagtttcat taatggcaga aatggataaa gttaaagaag aagccatgga aatcctgact 840
gctcgtcaga agaaagcaga agaactaaag agactcactg accttgccag tcagatggca 900
gagatgcagc tggccgaact cagggcagaa attaagcact ttgtcagcga gcgtaaatat 960
gacgaggagc tcgggaaagc tgcccggttt tcctgtgaca tcgaacagct gaaggcccaa 1020
atcatgctct gcggagaaat tacacatcca aagaacaact attcctcaag aactccctgc 1080
agctccctgc tgcctctgct gaatgcgcac gcagcaacct ctgggaaaca gagtaacttt 1140
tcccgaaaat catccactca caataagccc tctgaaggca aagcggcaaa ccccaaaatg 1200
gtgagcagtc tccccagcac cgccgacccc tctcaccaga ccatgccggc caacaagcag 1260
aatggatctt ctaaccaaag acggagattt aatccacagt atcataacaa caggctaaat 1320
gggcctgcca agtcgcaggg cagtgggaat gaagccgagc cactgggaaa gggcaacagc 1380
ngccacgaac acagaagaca gccgcacaac ggcttccggc ccaaaaacaa aggcggtgca 1440

aaaatcaaga ggcttccttg gggatgaaga cccccgaggc cccggcccat tctgaaaagc 1500
cccggcgaag gcagcacgct gcagacacct cggaggccag gcccttccgg ggtagtgtcg 1560
gtagggtttc acagtgcaat ctctgcccca cgagaataga agtttccaca gatgcagcag 1620
ttctctcagt cccggctgtg acgttggtgg cctgagctag gaggaaaaag agcagttttc 1680
actcagtttt ggttccctgc ccgaggtgct gacccaattc gctgccaaaa gagtgtcaat 1740
cagaatatac aaatccccgta tggttgtgtc atcctctctt aatcattttt actaattcta 1800
ataatcagct ctagcttgct tcataatttt catggctttg cttgatctgt tgatgctttc 1860
tctcatcaag actttgcagc attttagcca ggcagtattt actcattatt aggaaaatca 1920
agatgtggct gaagatcaga ggctcagtta gcaacctgtg ttgtagcagt gatgtcagtc 1980
cattgattgt ctttagagag ttaatgttac aaaaaagaat tcttaataat cagacaaaca 2040
tgatctgctg aggacacatg cgcttttgta gaatttaaca tctggtgttt ttctgaaaaa 2100
atatatatac atatattgct ttatttgaaa caaattaaaa tatgctgcat ttgaaaaaaa 2160
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaanaaa 2197

<210> 131
<211> 464
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (420)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<400> 131
attcatctcg ttcattgcta caccccgtta gatcctcggc ggtgccaggt ttcgtcgaat 60
ggaaacccaa atgggtataa gcgttccact ttggcagcgt tgctaaagca accaccacca 120
gcgttggaac ggttggctac taccaattta tggaccgcct attaagtggc atggttacag 180
ccaatacgat agtgagaaaa ccaaaacgca gcctagtgag agtagaaagt gtaacaccat 240
tgcccacaac tggttgctgc ctactgtcgc taaggcggct taggcaaaat ttgctgcagc 300
gtacgcggag agttgtttac caaagatgcc ttacaaccct gcgctgaaag gggctgctg 360
cttatgccaa ttatgtttta aggctggctt ctggtantt tgccnaatgg ttttgatttn 420
aggtttacca tttgttttcc ccaaattanc cctttgcgcg cccg 464

<210> 132
<211> 1950

<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1941)
<223> n equals a,t,g, or c

<400> 132
ggggtggctt gccacccaca gcaattgtga ctttgaaagg ccattccacc gttctatcaa 60
tccagctgct tcaggatgat gggcaacgtg gtaagaccag tgaattccac gaacatgagc 120
ccactgctgc acttctatgg ccgtaaatta acttgagaaa gtggaatcga attccgatgt 180
tgaattttcc ttctggcccc attcatgtgg caggtggtga ttcaggattg tcctcccggg 240
ctggcagcag ggccccagcg gcaccatgtc tgccctcgga gtcaccgtgg ccctgctggt 300
gtgggcggcc ttcctcctgc tggtgtccat gtggaggcag gtgcacagca gctggaatct 360
gcccccaggc cctttcccgc ttcccatcat cgggaacctc ttccagttgg aattgaagaa 420
tattcccaag tccttcaccc ggttggccca gcgcttcggg ccggtgttca cgctgtacgt 480
gggctcgcag cgcatggtgg tgatgcacgg ctacaaggcg gtgaaggaag cgctgctgga 540
ctacaaggac gagttctcgg gcagaggcga cctccccgcg ttccatgcgc acagggacag 600
gggaatcatt tttaataatg gacctacctg gaaggacatc cggcggtttt ccctgaccac 660
cctccggaac tatgggatgg ggaaacaggg caatgagagc cggatccaga gggaggccca 720
cttcctgctg gaagcactca ggaagaccca aggccagcct ttcgacccca ccttcctcat 780
cggctgcgcg ccctgcaacg tcatagccga catcctcttc cgcaagcatt ttgactacaa 840
tgatgagaag tttctaaggc tgatgtattt gtttaatgag aacttccacc tactcagcac 900
tccctggctc cagctttaca ataatttccc cagctttcta cactacttgc ctggaagcca 960
cagaaaagtc ataaaaaatg tggctgaagt aaaagagtat gtgtctgaaa gggtgaagga 1020
gcaccatcaa tctctggacc ccaactgtcc ccgggacctc accgactgcc tgctcgtgga 1080
aatggagaag gaaaagcaca gtgcagagcg cttgtacaca atggacggta tcaccgtgac 1140
tgtggccgac ctgttctttg cggggacaga gaccaccagc acaactctga gatatgggct 1200
cctgattctc atgaaatacc ctgagatcga agagaagctc catgaagaaa ttgacagggt 1260
gattgggcca agccgaatcc ctgccatcaa ggataggcaa gagatgccct acatggatgc 1320
tgtggtgcat gagattcagc ggttcatcac cctcgtgccc tccaacctgc cccatgaagc 1380
aacccgagac accattttca gaggatacct catccccaag ggcacagtcg tagtgccaac 1440
tctggactct gttttgtatg acaaccaaga atttcctgat ccagaaaagt ttaagccaga 1500
acacttcctg aatgaaaatg gaaagtttaa gtacagtgac tatttcaagc cattttccac 1560
aggaaaacga gtgtgtgctg gagaaggcct ggctcgcatg gagttgtttc ttttgttgtg 1620
tgccattttg cagcatttta atttgaagcc tctcgttgac ccaaaggata tcgacctcag 1680
ccctatacat attgggtttg gctgtatccc accacgttac aaactctgtg tcattccccg 1740
ctcatgagtg tgtggaggac accctgaacc ccccgctttc aaacaagatt tcgaattgtt 1800
tgaggtcagg atttctcaaa ctgattcctt tctttgcata tgagtatttg aaaataaata 1860
ttttcccaga atataaataa atcatcacat gattatttta actawaaaaa aaaaaaaaaa 1920
aaaaaaaaaa aaaaaaaaaa naaaaaaaaa 1950

<210> 133
<211> 2093
<212> DNA
<213> Homo sapiens

<400> 133
cacgcgttcg cccacgcgts sgctgggttt ctgaactgct gggtttctgc ttgctcctct 60
ggagatgcag cgtctgttga ctccagtgaa gcgcattctg caactgacaa gagcggtgca 120

ggaaacctcc ctcacacctg ctcgcctgct cccagtagcc caccaaaggt tttctacagc 180
ctctgctgtc cccctggcca aaacagatac ttggccaaag gacgtgggca tcctggccct 240
ggaggtctac ttcccagccc aatatgtgga ccaaactgac ctggagaagt ataacaatgt 300
ggaagcagga aagtatacag tgggcttggg ccagacccgt atgggcttct gctcagtcca 360
agaggacatc aactccctgt gcctgacggt ggtgcaacgg ctgatggagc gcatacagct 420
cccatgggac tctgtgggca ggctggaagt aggcactgag accatcattg acaagtccaa 480
agctgtcaaa acagtgctca tggaactctt ccaggattca ggcaatactg atattgaggg 540
catagatacc accaatgcct gctacggtgg tactgcctcc ctcttcaatg ctgccaactg 600
gatggagtcc agttcctggg atggtcgtta tgccatggtg gtctgtggag acattgccgt 660
ctatcccagt ggtaatgctc gtcccacagg tggggccgga gctgtggcta tgctgattgg 720
gcccaaggcc tctggccctg gagcgagggc tgaggggaac ccatatggag aatgtgtatg 780
acttctacaa accaaatttg gcctcggagt acccaatagt ggatgggaag ctttccatcc 840
agtgctactt gcgggccttg gatcgatgtt acacatcata ccgtaaaaaa atccagaatc 900
agtggaagca agctggcagc gatcgaccct tcacccttga cgatttacag tacatgatct 960
ttcatacacc cttttgcaag atggtccaga agtctctggc tcgcctgatg ttcaatgact 1020
tcctgtcagc cagcagtgac acacaaacca gcttatataa ggggctggag gctttcgggg 1080
ggctaaagct ggaagacacc tacaccaaca aggacctgga taaagcactt ctaaaggcct 1140
ctcaggacat gttcgacaag aaaaccaagg cttcccttta cctctccact cacaatggga 1200
acatgtacac ctcatccctg tacgggtgcc tggcctcgct tctgtcccac cactctgccc 1260
aagaactggc tggctccagg attggtgcct tctcttatgg ctctggttta gcagcaagtt 1320
tcttttcatt tcgagtatcc caggatgctg ctccaggctc tcccctggac aagttggtgt 1380
ccagcacatc agacctgcca aaacgcctag cctcccgaaa gtgtgtgtct cctgaggagt 1440
tcacagaaat aatgaaccaa agagagcaat tctaccataa ggtgaatttc tccccacctg 1500
gtgacacaaa cagccttttc ccaggtactt ggtacctgga gcgagtggac gagcagcatc 1560
gccgaaagta tgcccggcgt cccgtctaaa ggtgttctgc agatccatgg aaagcttcct 1620
gggaaacgta tgctagcaga gcttctcccc gtgaatcata tttttaagat cccactctta 1680
gctggtaaat gaatttgaat cgacatagta gccccataag catcagccct gtagagtgag 1740
gagccatctc tagcgggccc ttcattcctc tccatgctgc aatcactgtc ctgggcttat 1800
ggtgctatgg actaggggtc ctttgtgaaa gagcaagatg gagcaatgga gagaagacct 1860
cttcctgaat cactggactc cagaaatgtg catgcagatc agctgttgcc ttcaagatcc 1920
agataaactt tcctgtcatg tgttagaact ttattattat taatattgtt aaacttctgt 1980
gctgttcctg tgaatctcca aattttgtac cttgttctaa gctaatatat agcaattaaa 2040
aagagagaaa gaggaaaaaa aaaaaaactt tggggggggc ccggacccca att 2093

<210> 134
<211> 729
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (646)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (665)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (725)
<223> n equals a,t,g, or c

<400> 134
gctcgtgccg aattcggcac gagtcggcac gaggtccaag ggggtgtgtg ttcacgggaa 60
tgctgagtac cagcccggtt ctccagttta ttcctccaag tgccaggact gcgtgtgcac 120
ggacaaggtg gacaacaaca ccctgctcaa cgtcatcgcc tgcacccacg tgccctgcaa 180
cacctcctgc agccctggct tcgaactcat ggaggccccc ggggagtgct gtaagaagtg 240
tgaacagacg cactgtatca tcaaacggcc cgacaaccag cacgtcatcc tgaagcccgg 300
ggacttcaag agcgacccga agaacaactg cacattcttc agctgcgtga agatccacaa 360
ccagctcatc tcgtccgtct ccaacatcac ctgccccaac tttgatgcca gcatttgcat 420
cccgggctcc atcacattca tgcccaatgg atgctgcaag acctgcaccc ctcgcaatga 480
gaccagggtg ccctgctcca ccgtccccgt caccacggag gtttcgtacg ccggctgcac 540
caagaccgtc ctcatgaatc attgctccgg gtcctgcggg acatttgtca tgtamtcggc 600
caaggccagg ccctggacca cagcttgctc ctgctgcaaa gaaganaaaa ccagccagcg 660
tgagntggtc ctgactgccc aatggcggtc gctaacacac acctacacca catcgagact 720
gccantgcc 729

<210> 135
<211> 1189
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1160)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1175)
<223> n equals a,t,g, or c

<400> 135
gtaanacnga cagtacngta cggaattccc gggtcgaacc cacgcgtcct ggggtgagag 60
ggtgacgcat gtgccctctg gcagtctgct gctgtgtcca gagtccgact ccagctgggc 120

tgtaactggg cttggccccc gccttaggcc ccgccagcag gcgaagcagg gagatgtcag 180
actgctacac ggagctggag aaggcagtca ttgtcctggt ggaaaacttc tacaaatatg 240
tgtctaagta cagcctggtc aagaacaaga tcagcaagag cagcttccgc gagatgctcc 300
agaaagagct gaaccacatg ctgtcggaca cagggaaccg gaaggctgcg gataagctca 360
tccagaacct ggatgccaat catgatgggc gcatcagctt cgatgagtac tggaccttga 420
taggcggcat caccggcccc atcgccaaac tcatccatga gcaggagcag cagagcagca 480
gctagagacc cctttggcca caccttccag gcactggcct gatgccccgc cctggtgctc 540
tccccaggct ccctcctcag cctcctgccc acccagggcc ctttactctc ttctccctcc 600
agaccttcct ctgacccttg ctgaactggg gtccctttgt gagtgtctca gtctagaggt 660
acctccctcc ctggggggtc tcagctcctg gagtcgcagg cccttggggc ccctctgtga 720
gatctcaatg ctgtctgggg accctaagag ttttctcacc tgttcagtct catctaacct 780
tccaatgtct gatgttcctg ccaaattcct gcctgattct gggtccgtcc tgacctccaa 840
aggtcagctt ggtgcttgag gtctccctgc tcttggtggc agtggtagca gcaacagcag 900
cagcagcagc agcagcagca gcagagacct ctccactttc ccttagcccc tctgctgggt 960
agagaggcac tttcagggac ttccctccag ctgcctcttc atctgggaat gagctaagca 1020
aggctgagcc tcctcctgtt gcttgaaata atgatgatat aaaggctgga tttggagttt 1080
gtatcccctg gtcctctggg atgctcatta aaccttcccc actccttgga aaaaaaaaaa 1140
aaaaaargcg ggsggtttan aggatccaac ttacntaccc gtgcattgc 1189

<210> 136
<211> 1466
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1291)
<223> n equals a,t,g, or c

<400> 136
cngcttagtt cttccatttc acccttgcag ccagctgttg gccacggccc tgccctctgg 60
tctgccgtgc atctccctgt gccctcttgc tgcctgcctg tctgctgagg taaggtggga 120
ggagggctac agccacatcc cacccccctcg tccaatccca taatccatga tgaaaggtga 180
ggtcacgtgg cctcccaggc tgacttccca acctacagca ttgacgccaa cttggctgtg 240
aaggaagagg aaaggatctg gccttgtggt cactggcatc tgagccctgc tgatggctgg 300
ggctctcggg catgcttggg agtgcagggg gctcgggctg cctggcctgg ctgcacagaa 360
ggcaagtgct ggggctcatg gtgctctgag ctggcctgga ccctgtcagg atgggcccca 420
cctcagaacc aaactcactg tccccactgt ggcatgaggg cagtggagca ccatgtttga 480
gggcgaaggg cagagcgttt gtgtgttctg gggagggaag gaaaaggtgt tggaggcctt 540
aattatggac tgttgggaaa agggttttgt ccagaaggac aagccggaca aatgagcgac 600
ttctgtgctt ccagaggaag acgagggagc aggagcttgg ctgactgctc agagtctgtt 660
ctgacgccct gggggttcct gtccaacccc agcaggggcg cagcgggacc agccccacat 720
tccacttgtg tcactgcttg gaacctattt attttgtatt tatttgaaca gagttatgtc 780
ctaactattt ttatagattt gtttaattaa tagcttgtca ttttcaagtt catttttat 840
tcatatttat gttcatggtt gattgtacct tcccaagccc gcccagtggg atgggaggag 900
gaggagaagg ggggccttgg gcgctgcagt cacatctgtc cagagaaatt cctttggga 960

ctggaggcag aaaagcggcc agaaggcagc agccctggct cctttccttt ggcaggttgg 1020
ggaagggctt gcccccagcc ttaggatttc agggtttgac tgggggcgtg gagagagagg 1080
gaggaacctc aataaccttg aaggtggaat ccagttattt cctgcgctgc gagggtttct 1140
ttatttcact cttttctgaa tgtcaaggca gtgaggtgcc tctcactgtg aatttgtggt 1200
gggcgggggc tggaggagag ggtgggggc tggctccgtc cctcccagcc ttctgctgcc 1260
cttgcttaac aatgccggcc aactggcgac ntcacggttg cacttccatt ccaccagaat 1320
gacctgatga ggaaatcttc aatasgacgc aaagatcaat gcaaaaattg ttctatctga 1380
acatataact ggagctcgtc caaaaagcac actacgacag aactggacgt tcgcagcgtc 1440
cattcaaagc agcctcctca tcaagt 1466

<210> 137
<211> 140
<212> DNA
<213> Homo sapiens

<400> 137
ggttcaccta cggaaacctt gttacgactt ttacttcctc tagatagtca agttcgaccg 60
tcttctcagc gctccgccak ggccgtgggc cgaccccggc ggggccgatc cgarggcctc 120
actaaaccat ccaatcggta 140

<210> 138
<211> 4142
<212> DNA
<213> Homo sapiens

<400> 138
gaggggagcg agcggcgctt tgggggaggg gtcgcgtagg cgcctcacct gaccctgcgg 60
ccgtgcggtt gctgctccgg ggcaggtctc cttccaggcc aggggcccgg aatcatgtac 120
ataaagcagg tgattatcca gggttttcga agttacagag atcaaacaat tgtagatccc 180
ttcagttcaa aacataatgt gattgtgggc agaaatggat ctggaaaaag taactttttt 240
tatgcaattc agtttgttct cagtgatgag tttagtcatc ttcgtccaga acagcggttg 300
gctttattgc atgaaggtac tggtcctcgt gttatttctg cttttgtgga gattattttt 360
gataattcag acaaccggtt accaatcgat aaagaggaag tttcacttcg aagagttatt 420
ggtgccaaaa argatcagta tttcttagac aagaagatgg tcacgaaaaa tgatgtgatg 480
aacctccttg aaagcgctgg tttttctcga agcaatcctt attatattgt taaacaagga 540
aagatcaacc agatggcaac agcaccagat tctcagagat taaagctatt aagagaagta 600
gctggtacta gagtgtatga cgaacgaaag gaagaaagca tctccttaat gaaagaaaca 660
gagggcaaac gggaaaaaat caatgagttg ttaaaataca ttgaagagak attacatact 720
ctmgaggaag aaaaggaaga actagctcag tatcagaagt gggataaaat gagacgagcc 780
ctggaatata ccatttacaa tcaggaactt aacgagactc gtgccaaact tgatgagctt 840
tctgctaagc gagagactag tggagaaaaa tccagacaat taagagatgc tcagcaggat 900
gcaagagata aaatggagga tatcgaacgc caagttagag aattgaaaac aaaaatttca 960
gctatgaaag aagaaaaaga acagcttagt gctgaaagac aagagcagat taagcagagg 1020
actaagttgg agcttaaagc caaggattta caagatgaac tagcaggcaa tagtgaacaa 1080
aggaaacgtt tattaaaaga gaggcagaag ctgcttgaaa aaatagaaga aaagcagaaa 1140
gaactggcag aaacagaacc caaattcaac agtgtgaaag agaaagaaga acgaggaatt 1200
gctagattgg ctcaagctac ccaggaaaga acggatcttt atgcaaagca gggtcgagga 1260
agccagttta catcaaaaga agaaagggat aagtggatta aaaaggaact caagtcttta 1320
gatcaggcta ttaatgacaa gaaaagacag attgctgcta tacataagga tttggaagac 1380
actgaagcaa ataaagagaa aaatctggag cagtataata aactggacca ggatcttaat 1440
gaagtcaaag ctcgagtaga agaactggac agaaaatatt acgaagtaaa aaataagaaa 1500

gatgaactmc aaagtgaaag aaactacttg tggagagaag agaatgcaga acagcaagca 1560
cttgctgcta aaagagaaga tcttgaaaag aagcaacaac ttcttagagc agcaacagga 1620
aaggccattt taaatggaat agacagcata aacaaagtgc tagaccactt ccgtcgaaaa 1680
ggaataaacc agcatgttca aaatggctat catggtattg taatgaataa ctttgaatgt 1740
gaaccagctt tctacacatg cgtggaagtc actgctggaa acaggttatt ttatcacatt 1800
gttgattcag atgaagtcag cacgaagatt ttaatggagt ttaataaaat gaatcttcct 1860
ggagaggtta cttttctgcc tcttaacaag ttagatgtca gggatacagc ctatcctgaa 1920
accaatgatg ctattcctat gatcagcaaa ctgaggtaca atcccagatt tgacaaagct 1980
ttcaaacatg tgtttggaaa gactcttatt tgtcgtagca tggaagtttc aacccagctg 2040
gcccgtgctt tcactatgga ctgtattact ttggaaggtg accaagtcag ccatcggggt 2100
gctctaactg gggttatta tgacacaagg aagtctcgac ttgaattgca aaaagatgtt 2160
agaaaagcag aagaagaact aggtgaactt gaagcaaagc tcaatgaaaa cctgcgcaga 2220
aatattgaaa ggattaataa tgaaattgat cagttgatga accaaatgca acagatcgag 2280
acccagcaaa ggaaatttaa agcatctaga gatagcatat tatcagaaat gaagatgcta 2340
aaagagaaga ggcagcagtc agagaaaacc ttcatgccta agcaacgtag cttacagagt 2400
ttggaggcaa gcttgcatgc tatggagtct accagagagt cattgaaagc agaactggga 2460
actgatttgc tttctcaact gagtttggaa gatcagaaga gagtagatgc actgaatgat 2520
gagattcgtc aacttcagca ggaaaacaga cagttgctaa atgaaagaat taaattagaa 2580
ggtattatta ctcgagtaga gacttatctc aatgagaatc tgagaaaacg cttggaccaa 2640
gtagaacagg aacttaatga gctgagagag acagaagggg gtactgttct cacagccaca 2700
acatcagaac ttgaagccat caataaaaga gtaaaagaca ctatggcacg atcagaagat 2760
ttggacaatt ccattgataa aacagaagct ggaattaagg agcttcagaa gagtatggag 2820
cgctggaaaa atatggaaaa agaacatatg gatgctataa atcatgatac taaagaactg 2880
gaaaagatga caaatcggca aggcatgcta ttgaagaaga aagaagagtg tatgaagaaa 2940
attcgagaac ttggatcact tccccaggaa gcatttgaaa agtaccagac actgagcctc 3000
aaacagttgt ttcgaaaact tgagcagtgc aacacagaat taaagaagta cagccatgtt 3060
aacaaaaagg ctttggrtca gtttgtaaat ttctccgagc agaaagaaaa gttaataaag 3120
cgtcaagaag agttagatak gggttacaaa tcgatcatgg aactgatgaa tgtacttgaa 3180
cttcggaaat atgaagctat tcagttaact ttcaaacagg tatctaagaa cttcagtgaa 3240
gtattccaga agttagtacc tggtggcaaa gctactttgg tgatgaagaa aggagatgtg 3300
gagggcagtc agtctcaaga tgaaggagaa gggagtggtg agagtgagag gggttctggc 3360
tcacaaagca gtgtcccatc agttgaccag tttactggag ttggaattag ggtgtcattt 3420
acaggaaaac aaggtgaaat gagagaaatg caacagcttt caggtggaca gaaatccttg 3480
gtagcccttg ctctgatttt tgccattcag aaatgtgacc cggctccatt ttacttgttt 3540
gatgaaattg accaggctct ggatgctcag cacagaaagg ctgtgtcaga tatgattatg 3600
gaacttgctg tacatgctca gtttattaca actactttta ggcctgaact gcttgagtca 3660
gctgacaaat tctatggtgt aaagttcaga aataaggtta gtcatattga tgtgatcaca 3720
gcagagatgg ccaaagactt tgtagaagat gataccacac atggttaatt ggaaaatact 3780
acctactggt ttgggagatg tatatagtaa tatgattctc atacccagga actgtaaatt 3840
taaacctaaa tatttggcca atagttttca gacttaaagc atcatagtcc ttttatattt 3900
gtctttgtat tttataagat actctgtaat gtcatgtttg tactgatagt ttaagaattt 3960
aatttcctgt acaacttttt gtaaaatgtt ctgctcctat tttaaatgtt ttgaaacatg 4020
ctaaatattc tttcctaatt attttatcac ttatactacc tttttatag cttcaattaa 4080
ataatcggtt ttatgactaa aaaaaaaaaa aaaaaacysg gsggggggcc cggtacccaa 4140
tt 4142

<210> 139
<211> 1747
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1659)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1704)
<223> n equals a,t,g, or c

<400> 139
aagactccat ttcaaaaaaa aaaaaaaaaa aaaatccact catataaaag gtgagctcag 60
ctcactggtc catttctcag tggcttctcc atcctcattt gcaaacctca gagggataag 120
gcagttgaac ctgatgagca agaattataa cagcaaggaa acattaatgc ttagaattct 180
gagatccagc acaactcagt ctgtgggagc tcagctcgct gcccagggat aggtatgacc 240
tatgtctgcc ttaggctgct gggagatgcc attctccagt ttcagaagca ggcagggcaa 300
aggtcaagac tgtggtattg gggtcttttg gctctgaagg atcctggaac cactgatttt 360
ggtttattcc ctccagggtc taaagagaac aagaggtgct agctcttacc aaaacagatg 420
gtagagagag ttgctggcta tttaaaaagc tctttcatct kttaattcac ytcttctttt 480
cacctcttta accactcctc aggaacagaa cacttctagg actgggggtc ttttagctcc 540
ataagcaagt gagcagatgg gacaagttag tcttttctcc ctagaaacaa aggggatgcc 600
cagtggtttc cctttgcttc ccaacctaaa atttcaagtt taataaaata gcaattagca 660
gaagtgacca aattgggaga taattatcag tcatgaggaa agacacagat ttcggtcata 720
aagaatgtaa gggctataag tagaaacttt ctataaccta aatgatgtta tagaattatt 780
tttgagcagg agcagaaaga ttaaatatga tcacttcata cttctaaatc agaaatagga 840
agattaaaac cacagaacag tttgtgattt ctattgctgt agctaggtat cttactctgt 900
ccactcttgt tcaagtatct aactcttctg gaaaccaaat aggctttaga agagattatc 960
ctatattcct atcagtataa tactaaaatg taacttttta atcatctggt ttttaaaaga 1020
taaacagttt agcccatctc tccagagagc aaacatagga atatgactca ggagcctcct 1080
agggcttatc atcagccctc acacccgctt ccccctccaa cccacagcct ttgcttccag 1140
gtggcaggat tactactttg cctcttcagc agcatctact ctaggcatat tgatcatttt 1200
agacactggg agaagagaac ctcaaactag gaggaaaaga cagagcctcc acttagtttt 1260
gggaggggat ggcagacagt caaggagatg agcgtcctaa ggcatgttgg gatagggtca 1320
gatgcaccac ccatggagag gtttgtcaac acaaagacat ggaaggttag aggtttgtca 1380
acaaaaagac atggaaggtt aggtttgtca acacaaagac atggaagatt agaggtttgt 1440
caacacaaag acacaggaag aatgggctgc agaagattta gatgttttcc atttgggcac 1500
attttactta gctggagaac taggtttaaa acagcctggg taggaaaatt agaascaagc 1560
tggatgcagt gggctccatg cctgttaatc ccaacacttt tgggaggttc caggcaggaa 1620
agatcacttg ggcccaagaa gtccaacctg ccagcgganc ttaagattca caccacttgc 1680
actcccaccc tggggtttaa ttanaaccaa aaccctttc tccgaaaaaa aaaaaaaaaa 1740
aaaaaaa 1747

<210> 140
<211> 1240
<212> DNA
<213> Homo sapiens

<400> 140
gcggacgcgg ctggaggcgc ggcggcaggg ctgggcggcg gcggcggcgg cggtcatgga 60
acgccaagag gagtctctgt ccgcgcggcc ggccctggag accgaggggc tgcgcttcct 120
gcacaccacg gtgggctccc tgctggccac ctatggctgg tacatcgtct tcagctgcat 180

cсttctctac gtggtctttc agaagctttc cgcccggcta agagccttga ggcagaggca 240
gctggaccga gctgcggctg ctgtggaacc tgatgttgtt gttaaacgac aagaagcttt 300
agcagctgct cgactgaaaa tgcaagaaga actaaatgcg caagttgaaa agcataagga 360
aaaactgaaa caacttgaag aagaaaaaag gagacagaag attgaaatgt gggacagcat 420
gcaagaagga aaaagttaca aaggaaatgc aaagaagccc caggaggaag acagtcctgg 480
gccttccact tcatctgtcc tgaaacggaa atcggacaga aagcctttgc ggggaggagg 540
ttataacccg ttgtctggtg aaggaggcgg agcttgctcc tggagacctg gacgcagagg 600
cccgtcatct ggcggatgag gctaagaatc ttgttagtgt cacttttgac attagcaaga 660
tgaaccctta accctcgatt caattgcctt acgcacgctt ttcacagtga ctagccaagg 720
ggaggtgggg ttgatttctg ttcctaacta cacctgcata tgtcagggct ccagtcagca 780
aaaggtatag atgttgcctc taggcatgag gtcattggtc acattctact tggagacagt 840
gattgcattc attgatttca tggttaattg ctagttggta ggtaaaggcc tctagatgat 900
tagcaatctt gataaaagag gcctagtaat gttcttttga ggttagaaat ccttgctgct 960
aggacagtct ctgtgacagg ttgcgttgaa tgatgtcttc cttatcaatg gtgagcccac 1020
cagtgaggat tactgatgtg gacagttgat ggggtttgtt tctgtatatt tatttttatg 1080
tacagaactt tgtaaaaacg aaactattta aaaaacaaga ataacatttt tagcatcttt 1140
attcaaggag atttatggac ttcaatttgt ctatcaaaca ttaaatagct ttttattaca 1200
acctccaaaa aaaaaaaaaa aaaaaaaaaa aaawaaacaa 1240

<210> 141
<211> 671
<212> DNA
<213> Homo sapiens

<400> 141
gtatcctgca ggtcccggtc cggaattccc gggtctaccc acgcgtccgc gtgcgcaayg 60
tgccctggga atttggcgac gtaattcccg actatgtgct gggccagagc acctgtgccc 120
tgttcctcag cctccgctac cacaacctgc acccagacta catccatggg cggctgcaga 180
gcctggggaa gaacttcgcc ttgcgggtcc tgcttgtcca ggtggatgtg aaagatcccc 240
agcaggccct caaggagctg gctaagatgt gtatcctggc cgactgcaca ttgatcctcg 300
cctggagccc cgaggaagct gggcggtacc tggagaccta caaggcctat gagcagaaac 360
cagcggacct cctgatggag aagctagagc aggacttcgt ctcccgggtg actgaatgtc 420
tgaccaccgt gaagtcagtc aacaaaacgg acagtcagac cctcctgacc acatttggat 480
ctctggaaca gctcatcgcc gcatcaagag aagatctggc cttatgccca ggcctgggcc 540
ctcagaaagc ccggaggctg tttgatgtcc tgcacgagcc cttcttgaaa gtaccctgat 600
gaccccagct gccaaggaaa cccccagtgt aataataaat cgtcctccca ggccaggcaa 660
aaaaaaaaaa a 671

<210> 142
<211> 3265
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3234)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3256)

<223> n equals a,t,g, or c

<400> 142
ggcaccgtgg acattgagag cctgacgggc taccgcacct accgctgtgc ccaccccctg 60
gccacactct tcaagatcct ggcgtccttc tacatcagcc tagtcatctt ctacggcctc 120
atctgcatgt atacactgtg gtggatgcta cggcgctccc tcaagaagta ctcgtttgag 180
tcgatccgtg aggagagcag ctacagcrac atccccgacg tcaagaacga cttcgccttc 240
atgctgcacc tcattgacca atacgacccg ctctactcca agcgcttcgc cgtcttcctg 300
tcggargtga gtgagaacaa gctgcggcag ctgaacctca acaacgagtg gacgctggac 360
aagctccggc agcggctcac caagaacgcg caggacaagc tggagctgca cctgttcatg 420
ctcagtggca tccctgacac tgtgtttgac ctggtggagc tggaggtcct caagctggag 480
ctgatccccg acgtgaccat cccgcccagc attgcccagc tcacgggcct caaggagctg 540
tggctctacc acacagcggc caagattgaa gcgcccgcgc tggccttcct gcgcgagaac 600
ctgcgggcgc tgcacatcaa gttcaccgac atcaaggaga tcccgctgtg gatctatagc 660
ctgaagacac tggaggagct gcacctgacg ggcaacctga gcgcggagaa caaccgctac 720
atcgtcatcg acgggctgcg ggagctcaaa cgcctcaagg tgctgcggct caagagcaac 780
ctaagcaagc tgccacaggt ggtcacagat gtgggcgtgc acctgcagaa gctgtccatc 840
aacaatgagg gcaccaagct catcgtcctc aacagcctca agaagatggc gaaacctgac 900
tgagctggag ctgatccgct gtgacctgga gcgcatcccc cactccatct tcagcctcca 960
caacctgcag gagattgacc tcaaggacaa caacctcaag accatcgagg agatcatcag 1020
cttccagcac ctgcaccgcc tcacctgcct taagctgtgg tacaaccaca tcgcctacat 1080
ccccatccag atcggcaacc tcaccaacct ggagcgcctc tacctgaacc gcaacaagat 1140
cgagaagatc ccacccagc tcttctactg ccgcaagctg cgctacctgg acctcagcca 1200
caacaacctg accttcctcc ctgccgacat cggcctcctg cagaacctcc agaacctagc 1260
catcacggcc aaccggatcg agacgctccc tccggagytc ttccagtgcc ggaagctgcg 1320
ggccctgcac ctgggcaaca acgtgctgca gtcactgccc tccagggtgg gcgagctgac 1380
caacctgacg cagatcgagc tgcggggcaa ccggctggag tgcctgcctg tggagctggg 1440
cgagtgccca ctgctcaagc gcaggcttgg tggtggagga ggacctgttc aacacactgc 1500
caccсgaggt gaaggagcgg ctgtggaggg ctgacaagga gcaggcctga gcgaggccgg 1560
cccagcacag caagcagcag gaccgctgcc cagtcctcag gcccggaggg caggcctagc 1620
ttctcccaga actcccggac agccaggaca gcctcgtggc tgggcaggag cctggggccg 1680
cttgtgagtc aggccagagc gagaggacag tatctgtggg gctggcccct tttctccctc 1740
tgagactcac gtcccccagg gcaagtgctt gtggaggaga gcaagtctca agagcgcagt 1800
atttggataa tcagggtctc ctccctggag gccagctctg ccccaggggc tgagctgcca 1860
ccagaggtcc tgggaccctc actttagttc ttggtattta tttttctcca tctcccacct 1920
ccttcatcca gataacttat acattcccaa gaaagttcag cccagatgga aggtgttcag 1980
ggaaaggtgg gctgcctttt cccсttgtcc ttatttagcg atgccgccgg gcatttaaca 2040
cccacctgga cttcagcaga gtggtccggg gcgaaccagc catgggacgg tcacccagca 2100
gtgccggggct gggctctgcg gtgcggtcca cgggagagca ggcctccagc tggaaaggcc 2160
aggcctggag cttgcctctt cagtatttgt ggcagtttta gtttttttgtt ttttttttt 2220
taatcaaaaa acaatttttt taaaaaaaaa aagctttgaa aatggatggt ttgggtatta 2280
aaaagaaaaa aaaaacttaa aaaaaaaaag acactaacgg ccagtgagtt ggagtctcag 2340
ggcagggtgg cagtttccct tgagcaaagc agccagacgt tgaactgtgt ttcctttccc 2400
tgggcgcagg gtgcagggtg tcttccggat ctggtgtgac cttggtccag gagttctatt 2460
tgttcctggg gagggaggtt tttttgtttg ttttttgggt ttttttggtg tcttgttttc 2520
tttctcctcc atgtgtcttg gcaggcactc atttctgtgg ctgtcggcca gagggaatgt 2580
tctggagctg ccaaggaggg aggagactcg ggttggctaa tccccggatg aacggtgctc 2640
cattcgcacc tcccctcctc gtgcctgccc tgcctctcca cgcacagtgt taaggagcca 2700
agaggagcca cttcgcccag actttgtttc cccaccgcct gcggcatggg tgtgtccagt 2760
gccaccgctg gcctccgctg cttccatcag ccytgtcgcc acctggtcct tcatgaagag 2820
cagacactta gaggctggtc gggaatgggg aggtcgcccc tgggagggca ggcgttggtt 2880

ccaagccggt tcccgtccct ggcgcctgga gtgcacacag cccagtcggc acctggtggc 2940
tggaagccac cctgctttag atcactcggg tccccacctt agaagggtcc ccgccttaga 3000
tcaatcacgt ggacactaag gcacgtttta gagtctcttg tcttaatgat tatgtccatc 3060
cgtctgtccg tccatttgtg ttttctgcgt cgtgtcattg gatataatcc tcagaaataa 3120
tgcacactag cctctgacaa ccatgaagca aaaatccgtt acatgtgggt ctgaacttgt 3180
agactcggtc acagtatcaa ataaaatcta taacagaaaa aaaaaaaaaa gggngccgtc 3240
taaagatcaa cttctncctt gatca 3265

<210> 143
<211> 765
<212> DNA
<213> Homo sapiens

<400> 143
gcccacgcgt ccgcccacgc gtccgcggac gcgtgggggg tgacattgag ctcaccagcg 60
ccaccgtccc cggcgaagtt ctgcgctggt cggcggagta gcaagtggcc atggggagcc 120
tcagcggtct gcgcctggca gcaggaagct gttttaggtt atgtgaaaga gatgtttcct 180
catctctaag gcttaccaga agctctgatt tgaagagaat aaatggattt tgcacaaaac 240
cacaggaaag tcccggagct ccatcccgca cttacaacag agtgccttta cacaaaccta 300
cggattggca gaaaaagatc ctcatatggt caggtcgctt caaaaaggaa gatgaaatcc 360
cagagactgt ctcgttggag atgcttgatg ctgcaaagaa caagatgcga gtgaagatca 420
gctatctaat gattgccctg acggtggtag gatgcatctt catggttatt gagggcaaga 480
aggctgccca aagacacgag actttaacaa gcttgaactt agaaaagaaa gctcgtctga 540
aagaggaagc agctatgaag gccaaaacag agtagcagag gtatccgtgt tggctggatt 600
ttgaaaatcc aggaattatg ttataacgtg cctgtattaa aaaggatgtg gtatgaggat 660
ccatttcata aagtatgatt tgcccaaacc tgtaccattt ccgtatttct gctgtagaag 720
tagaaataaa ttttcttaaa taaaaaaaaa aaaaaaaaac tcgag 765

<210> 144
<211> 1694
<212> DNA
<213> Homo sapiens

<400> 144
gcccacgcgt ccgggttgct ctattattat tattattatt atttgccttt ttttaatcac 60
catttatttg tgtaatcttt ctccattgat tggctgtcat tcttataata tctgaactac 120
cccataaaat aattctctga cttaaaggca tttagctttt gcttatcgtt tttacatcct 180
ctattcaact aagacactgt cttgagagtt attttttcca gatggatcgt tggcctaaat 240
tttcacactt ctcccctgtt catccttttt cctcttccct gcttcctggg aataaaagga 300
actttttttaa aaaaattaat tagtccacag gwctmattat ctttctttat gattaatcta 360
tgactttttg gtacaagaac aatggaaaaa gtgaattaag gtaatgaaca aaacctttca 420
cccacttaaa cattttccag ttttgagatt cctcttcgtg tttgtggtgt cttccccttg 480
ttaccccttc tgcccttttt ctctgactat ggtaatttgg tctttaggct catatcagtc 540
tccccgagac attctgcagt cattatcacc tttttgggtg gattttattt tgttttattt 600
tgtttttttt aaaaaaataa ctttttaaca ttggtgcata tttgcttggg atagagcttg 660
tgtaatttac caatcgtatt gattgtaagt gattgtgccc tgcagaggta tatttaacaa 720
gacaaaaata atcttggtta ataaaggagc ccatgagatt tgagtcaggt tgtaagtgaa 780
atcacttaca cttttggata gaatttatac tcctgctctt ataaatcagt ggtagactta 840
ccattttttta aagtttcttt gcattttttt gttttttttat tgccacagct ccctattctt 900
tcttgcctgc ctccaccccc ctgttcagga aaaaaaaaaa ttgagcctta aagtgacagc 960
tgatttttta attgctgaat tttgtgaaat tttacttttt ccaagtgttt ccaactttaa 1020

aaagagaagt gaagacaaat aggttggaat ggtgaagaca aatggrttgg ratttcacag 1080
gctgtgaata attccttagg atctggcaaa ccgtgaagtc ttatttgaag accttatctc 1140
ctgagagttc ttttggagta ggaaaaagaa ccctatttga aatagaccgt tttctcttg 1200
tttttaatct gtttaatatt tctgattttt aagcagcttt caaaacaagt gtggtggaaa 1260
aaaagaaata gtagtaggaa gatgtttagg gcagcagaac tctgggtcta aataagtaca 1320
tgttcccact tgttgccgat ttttgagagt actagggcca tctttctcaa ttttgtatta 1380
tttgtgtgca tgtttatatc aaagatgccc attttgttaa aatgctattt cctttattac 1440
cttggaaact gactcagcct catgttgctc ctaattagtg tttaaggctc ccatgagttg 1500
cagataaaat gatttatttt aacaagtaga aggaggtgat tcacctttg gattgtaaat 1560
atatgaaaat gtctacaagg tctttatctg ctttctgtca gcatttatat taaatgataa 1620
attaatgagg aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1680
aaaaaagggc ggcc 1694

<210> 145
<211> 823
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (182)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (731)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (743)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (749)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (755)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (817)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (821)

<223> n equals a,t,g, or c

<400> 145
tgtcacagac tacttcatca gtcgcttatc tggagctggg accaaggttt ctgccaggcc 60
ttgggatcag ctcttggggg tcagagcagc cttcccacat cctctggcac tgctgaactt 120
ttgcagcagc tctttcctcc tctyttggat gcccttcgag agcccaggtt acgacggatt 180
tnctgccagc ctgcagatcc tgcgcctgtc gccctgcagg tctctgtacc cttcagacca 240
ccttgctctg gttcctgggc agagctcagc agtacttggc agcatgggac ccagcttcct 300
tcctgctcct gatccaaaag gacttacctc ctctgttgca tgaggcagaa gctttgtata 360
gcctggcctc agaggaaagc ttagctctgg aagtggagca gcagctgggc ctggagatcc 420
agaagctgac tgcacagatc cagctcctgc ctgaagagtc actaagtgtc ttttctcaag 480
aatgtcataa acaagccatg caaggtttca agctctacat gccacggggt cggtactggc 540
ggcttcgtct ctgtcctgaa cctcccagtg ctcctagtga gtatgctggt ttagtggtcc 600
gcaccgtact ggagcctgtg ttgcaaggat tgcaagggtt gcacctcaag cccaggcccc 660
tgcccttggt caggctctga cggscatcgt gggtgcctgg cttgaccaca ttcttaccca 720
tgggattcgg nttcaacctg canggagcnc tkcancttaa acaagacttt ggaatggtca 780
ggagtttgtg gaaaagagca tggacctgtc cctgatntcg nca 823

<210> 146
<211> 1134
<212> DNA
<213> Homo sapiens

<400> 146
caaaagcata gagaaattat aaaattcaag aacagatgtt agaatggaaa ctgatctaga 60
ggttataata aaggataata gtcttgtgct gacaccatca cacatcaaag cctacatgtt 120
gatgactctt caaggattag aatatttaca tcaacattgg atcctacata gggatctgaa 180
accaaacaac ttgttgctag atgaaaatgg agttctaaaa ctggcagatt ttggcctggc 240
caaatctttt gggagcccca atagagctta tacacatcag gttgtaacca ggtggtatcg 300
ggcccccgag ttactatttg gagctaggat gtatggtgta ggtgtggaca tgtgggctgt 360
tggctgtata ttagcagagt tacttctaag ggttcctttt ttgccaggag attcagacct 420
tgatcagcta acaagaatat ttgaaacttt gggcacacca actgaggaac agtggccgga 480
catgtgtagt cttccagatt atgtgacatt taagagtttc cctggaatac ctttgcatca 540
catcttcagt gcagcaggag acgacttact agatctcata caaggcttat tcttatttaa 600
tccatgtgct cgaattacgg ccacacaggc actgaaaatg aagtatttca gtaatgcgcc 660
agggccaaca cctggatgtc agctgccaag accaaactgt ccagtggaaa ccttaaagga 720
gcaatcaaat ccagctttgg caataaaaag gaaaagaaca gaggccttag aacaaggagg 780
attgcccaag aaactaattt tttaaagaga acactggaca acattttact actgagggaa 840
atagccaaaa aggcaaataa tggaaaaata gtaaacatta agtaaatgct gtagaagtga 900
gtttgtaaat attctacaca tgtaaaatat gtaaaactat gggttatttt tattaaatgt 960
attttaaaat aaaaatttaa ttctggtttt tctgattaga gtgcmaaagt gagaaaagtt 1020
caatactctt gaatgtagaa ttgaaaatgc attagggaaa acttaataaa aattattacc 1080
agttatttgg aagatctgac ccatatagta tcacaaatct gtagtagcat gggt 1134

<210> 147
<211> 1486
<212> DNA
<213> Homo sapiens

<400> 147
gcggacgcgt gggggcgggg gtgtcgtttc ctttcgctga tgcaagagcc tagtgcggtg 60

gtgggagagg tatcggcagg ggcagcgctg ccgccggggc ctggggctga cccgtctgac 120
ttcccgtccg tgccgagccc actcgagccg cagccatgtc tggggacgag atgattttg 180
atcctactat gagcaagaag aaaaagaaga agaagaagcc ttttatgtta gatgaggaag 240
gggataccca aacagaggaa acccagcctt cagaaacaaa agaagtggag ccagagccaa 300
ctgaggacaa ggatttggaa gctgatgaag aggacactag gaaaaaagat gcttctgatg 360
atctagatga cttgaacttc tttaatcaaa agaaaaagaa gaaaaaaact aaaaagatat 420
ttgatattga tgaagctgaa gaaggtgtaa aggatcttaa gattgaaagt gatgttcaag 480
aaccaactga accagaggat gaccttgaca ttatgcttgg caataaaaag aagaaaaaga 540
agaatgttaa gttcccagat gaggatgaaa tactagagaa agatgaagct ctagaagatg 600
aagacaacaa aaaagatgat ggtatctcat tcagtaatca gacaggccct gcttgggcag 660
gctcagaaag agactacaca tacgaggagc tgctgaatcg agtgttcaac atcatgaggg 720
aaaagaatcc agatatggtt gctggggaga aaaggaaatt tgtcatgaaa cctccacaag 780
tcgtccgagt aggaaccaag aaaacttctt ttgtcaactt tacagatatc tgtaaactat 840
tacatcgtca gcccaaacat ctccttgcat tttgttggc tgaattgggt acaagtggtt 900
ctatagatgg taataaccaa cttgtaatca aaggaagatt ccaacagaaa cagatagaaa 960
atgtcttgag aagatatatc aaggaatatg tcacttgtca cacatgccga tcaccggaca 1020
caatcctgca gaaggacaca cgactctatt tcctacagtg cgaaacttgt cattctagat 1080
gttctgttgc cagtatcaaa accggcttcc aggctgtcac gggcaagcga gcacagctcc 1140
gtgccaaagc taactaattt gctaatcact gattttgcaa agcttgttgt ggagatgtgg 1200
ctggacaggt ttgccatcag agtggatata ccgttgtatt aaaaacaaga taaaaaagct 1260
gccaagattt ttggcgagtg gttggtctga agtccttgca agacgctgat gctcaagctg 1320
ttgacatact cattgcctac tttaacacct gtcagagaaa cgtgatatgg ggtaaggagg 1380
tgcttttta aaatcgttca tagacttctg taaaatgcaa gataaattaa agttattata 1440
acagtgataa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaa 1486

<210> 148
<211> 153
<212> DNA
<213> Homo sapiens

<400> 148
cgcctgtgca gcgcaagatc gaggctcgct cggcagagga ctccttcaca ggcttcgtcc 60
ggaccctgta ctttgctgac acctacctga aggagtgcca aggctgagcg gccaggcctc 120
cagaacatgg agctggcgcc tgtgcagcgc aag 153

<210> 149
<211> 882
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (870)
<223> n equals a,t,g, or c

<400> 149
acgaagggca aagntggtgt caccncggtg cgccgtctag actagtggat cccggctcag 60
gattcgcacg tgcctcctgg tctcagtatg gcgctgtcct gggttcttac agtcctgagc 120
ctcctacctc tgctggaagc ccagatccca ttgtgtgcca acctagtacc ggtgcccatc 180
accaacgcca ccctggaccr gatcactggc aagtggtttt atatcgcatc ggcctttcga 240
aacgaggagt acaataagtc ggttcaggag atccaagcaa ccttctttta cttcaccccc 300
aacaagacag aggacacgat ctttctcaga gagtaccaga cccgacagga ccagtgcatc 360
tataacacca cctacctgaa tgtccagcgg gaaaatggga ccatctccag atacgtggga 420
ggccaagagc atttcgctca cttgctgatc ctcagggaca ccaagaccta catgcttgct 480
tttgacgtga acgatgagaa gaactggggg ctgtctgtct atgctgacaa gccagagacg 540
accaaggagc aactgggaga gttctacgaa gctctcgact gcttgcgcat tcccaagtca 600
gatgtcgtgt acaccgattg gaaaaaggat aagtgtgagc cactggagaa gcagcacgag 660
aaggagagga aacaggagga gggggaatcc tagcaggaca cagccttgga tcaggacaga 720
gacttggggc catcctgccc ctccaacccg acatgtgtac ctcagctttt tccctcactt 780
gcatcaataa agcttctgtg tttggaacag ctaaaaaaaa aaaaaaaaaa aaaaaaaaaa 840
actcgagggg gggcccgkaa cccaatcgcn tgatattatt ag 882

<210> 150
<211> 1508
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (155)
<223> n equals a,t,g, or c

<400> 150
ctaaggaggg gtgaaccggc ccaggtcgga aacggagcag gtcaaaactc ccgtgctgag 60
gtgggaggat cgcttgagcc caggagttct gggctgtagt gcgctatgcc gatcgggtgt 120
ccgcantcta gccttggcaa cagtgcaaga ctgtntcaaa aacagcaaca garagcagga 180
cgtgagactt ctacctgctc actcagaatc atttctgcac caaccatggc cacgtttgtg 240
gagctcagta ccaaagccaa gatgcccatt gtgggcctgg gcacttggaa gtctcctctc 300
ggcaaagtga aagaagcagt gaaggtggcc attgatgcag gatatcggca cattgactgt 360
gcctatgtct atcagaatga acatgaagtg ggggaagcca tccaagagaa gatccaagag 420
aaggctgtga agcgggagga cctgttcatc gtcagcaagt tgtggcccac tttctttgag 480
agaccccttg tgaggaaagc ctttgagaag accctcaagg acctgaagct gagctatctg 540
gacgtctatc ttattcactg gccacaggga ttcaagtctg ggatgacct tttccccaaa 600
gatgataaag gtaatgccat cggtggaaaa gcaacgttct tggatgcctg ggaggccatg 660
gaggagctgg tggatgaggg gctggtgaaa gcccttgggg tctccaattt cagccacttc 720
cagatcgaga agctcttgaa caaacctgga ctgaaatata aaccagtgac taaccaggtt 780
gagtgtcacc catacctcac gcaggagaaa ctgatccagt actgccactc caagggcatc 840

accgttacgg cctacagccc cctgggctct ccggatagac cttgggccaa gccagaagac 900
ccttccctgc tggaggatcc caagattaag gagattgctg caaagcacaa aaaaaccgca 960
gcccaggttc tgatccgttt ccatatccag aggaatgtga ttgtcatccc caagtctgtg 1020
acaccagcac gcattgttga gaacattcag gtctttgact ttaaattgag tgatgaggag 1080
atggcaacca tactcagctt caacagaaac tggagggcct gtaacgtgtt gcaatcstct 1140
catttggaag actatccctt cgatgcagaa tattgaggtt gaatctcctg gtgagattat 1200
acaggagatt ctctttcttc gctgaagtgt gactacctcc actcatgtcc cattttagcc 1260
aagcttattt aagatcacag tgaacttagt cctgttatag acgagaatcg aggtgctgtt 1320
ttagacattt atttctgtat gttcaactag gatcagaata tcacagaaaa gcatggcttg 1380
aataaggaaa tgacaatttt ttccacttat ctgatcagaa caaatgttta ttaagcatca 1440
gaaactctgc caacactgag gatgtaaaga tcaataaaaa aaataataat cataaaaaaa 1500
aaaaaaaa 1508

<210> 151
<211> 1232
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1213)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1217)
<223> n equals a,t,g, or c

<400> 151
naactgngct agcatgccca gcccacagag agcctccact agagtgatgc taagtggaaa 60
tgtgaggtgc agctgccaca gagggccccc accagggaaa tgtctagtgt ctagtggatc 120
caggccacag gagagagtgc cttgtggagc gctgggagca ggacctgacc accaccagga 180
ctccagcctg ggtgacaggg tgaacgccat ctcaaaaaat aaaaattaaa aaataaaaaa 240
agaacctgga tctcaattta atttttcata ttcttgcaat gaaatggact tgaggaagct 300
aagatcatag ctagaaatac agataattcc acagcacatc tctagcaaat ttagcctatt 360
cctattctct agcctattcc ttaccacctg taatcttgac catatacctt ggagttgaat 420
attgttttca tactgctgtg gtttgaatgt tccctccaac actcatgttg agacttaatc 480
cctaatgtgg caatactgaa aggtggggcc tttgagatgt gattggatcg taaggctgtg 540
ccttcattca tgggttaatg gattaatggg ttatcacagg aatgggactg gtggctttat 600
aagaagagga aaagagaact gagctagcat gcccagccca cagagagcct ccactagagt 660
gatgctaagt ggaaatgtga ggtgcagctg ccacagaggg cccccaccag ggaaatgtct 720

agtgtctagt ggatccaggc cacaggagag agtgccttgt ggagcgctgg gagcaggacc 780
tgaccaccac caggacccca gaactgtgga gtcagtggca gcatgcagcg ccccccttggg 840
aaagctttag gcaccagcct gcaacccatt cgagcagcca cgtaggctgc acccagcaaa 900
gccacaggca cggggctacc tgaggccttg gggggcccaat ccctgctcca gtgtgtccgt 960
gaggcagcac acgaagtcaa aagagattat tctcttccca cagatacctt ttctctccca 1020
tgaccctttta acagcatctg cttcattccc ctcaccttcc caggctgatc tgaggtaaac 1080
tttgaagtaa aataaaagct gtgtttgagc atcaaaaaaa aaaaaaaaaa aaaaaaaaaa 1140
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1200
aaaaaaaaaa aangggnggc cgttttaaag ga 1232

<210> 152
<211> 999
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (917)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (951)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (995)
<223> n equals a,t,g, or c

<400> 152
gcgcagctcc gccggcgcct ggtcccagcg cccgcggcgc cgcgtccccg gcccaaccat 60
ggcrtcctcc gcggccggct gcgtggtgat cgttggcagt ggagtcattg ggygaagctg 120
ggccatgctg tttgccagtg gaggcttcca ggtgaaactc tatgacattg agcaacagca 180
gataaggaay gccctggaaa acatcagaaa ggagatgaag ttgctggagc aggcaggttc 240
tctgaaaggc tccctgagtg tggaagagca gctgtcactc atcagtggtt gtcccaatat 300
ccaagaagca gtagagggyg ccatgcwcat ycwgtgaatc cgccatacta catcccgctg 360
gttgagctgg tcccccaccc ggagacggcc cctacgacag tggacagaac ccacgccctg 420
atgaagaaga ttggacagtg ccccatgcga gtccagaagg aggtggccgg cttcgttctg 480
aaccgcctgc aatatgcaat catcagcgag gcctggcggc tagtggagga aggaatcgtg 540
tctcctagtg acctggacct tgtcatgtca gaagggttgg gcatgcggta tgcattcatt 600
ggacccctgg aaaccatgca tctcaatgca gaaggtatgt taagctactg cgacagatac 660
agcgaaggca taaaacatgt cctacagact tttggaccca ttccagagtt ttccagggcc 720
actgctgaga aggttaacca ggacatgtgc atgaaggtcc ctgatgaccc ggagcactta 780
gctgccagga ggcagtggag ggacgagtgc ctcatgagac tcgccaagtt gaaragtcaa 840
gtgcagmyaa sctggaratt tccacctttt cttttcagct tgattgcatt tgactatatt 900
ttacagccag tgattgnagt ttcatggtaa tatgtggcaa aatatttttg naattatttt 960
ctaatccctt tcttaagtac tctggggccc tgcanttat 999

<210> 153
<211> 1212

<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (794)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1047)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1146)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1176)
<223> n equals a,t,g, or c

<400> 153
cacgcccacc tctctcctgg agcgctgggc cttcgctggc cgcaccggca gccatgagct 60
cggagatgga gccgctgctc tgggcctgga gctattttag gcgcaggaag ttccagctct 120
ggccgatcta tgcacgcaga tgctggagaa gtccccttat gaccaggcgg ctgctgcaga 180
tgggcattta taacggccag ctttttaaca atctggggct gtgttgcttc tatgcccagc 240
agtatgatat gactctgacc tcatttgaac gtgccctttc tttggctgaa aatgaagaag 300
aggcagctga tgtctggtac aacttgggac atgtagctgt gggaatagga gatacaaatt 360
tggcccatca gtgcttcagg ctggctctgg tcaacaacaa caaccacgcc gaggcctaca 420
acaacctggc tgtgctggag atgcggaagg gccacgttga acaggcaagg gcactattac 480
aaactgcatc atcattagca ccccatatgt atgaaccgca ttttaatttt gcaacaatct 540
ctgataagat tggagatctg cagagaagct atgttgctgc gcagaagtct gaagcagcat 600
ttccagacca tgtggacaca caacatttaa ttaaacaatt aaggcagcat tttgctatgc 660
tctgattgtt ccttagacca catatgttct tatgaagcmg cattatgcaa ggggaaaaaa 720
gcactatgtc tgtgtatgta tgtatatagt gtaatacgta tattttaaca aacctgtcct 780
tgatattagt taanggtgac acataagggt gacacagaat gtgtaatgca aatttcatag 840
taatagtaac tttataaaat aatattataa aatacaggat ttaaaccttt ctaaatagat 900
cctgaaactg tctctcacat tatatagtag atgtttgttt ataatgttta caaaacattt 960
tggtgaattt cctcaatgtt ttataaatgt acatttttta agtccttaag ctgactctta 1020
gccatcatgt agcttaagga gtctggnaat ctggccattg aaaactggca cctttgaagc 1080
caggtgtggt tagcatgtgc ctatagtccc agcttacttg gggaggtggg aggtggggag 1140
ggattnatga aattaggagg acttttccct ttaagnactt ttaaaaaaat ggtattttga 1200
aaacctattt tt 1212

<210> 154
<211> 2361
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (92)
<223> n equals a,t,g, or c

<400> 154
ggagccttgc cttgctgctc tacctccacc atgccaagtg gtcccaggct gcacccatgg 60
cagaaggagg agggcagaat catcacgaag gntgaagttc atggatgtct atcagcgcat 120
actgccatcc aatcgagacc ctggtggaca tcttccagga gtaccctgat gagatcgagt 180
acatcttcaa gccatcctgt gtgcccctga tgcgatgcgg gggctgctgc aatgacgagg 240
gcctggagtg tgtgcccact gaggagtcca acatcaccat gcagattatg cggatcaaac 300
ctcaccaagg ccagcacata ggagagatga gcttcctaca gcacaacaaa tgtgaatgca 360
gaccaaagaa agatagagca agacaagaaa aatgtgacaa gccgaggcgg tgagccgkgc 420
aggaggaagg agcctccctc aggtttcgg gaaccagatc tctcaccagg aaagactgat 480
acagaacgat cgatacagaa accacgctgc cgccaccaca ccatcaccat cgacagaaca 540
gtccttaatc cagaaacctg aaatgaagga agaggagact ctgcgcagag cactttgggt 600
ccggagggcg agactccggc ggaagcattc ccgggcgggt gacccagcac ggtccctctt 660
ggaattggat tcgccatttt atttttcttg ctgctaaatc accgagcccg gaagattaga 720
gagttttatt tctgggattc ctgtagacac acccacccac atacatacat ttatatatat 780
atatattata tatatataaa aataaatatc tctattttat atatataaaa tatatatatt 840
ctttttttaa attaacagtg ctaatgttat tggtgtcttc actggatgta tttgactgct 900
gtggacttga gttgggaggg gaatgttccc actcagatcc tgacagggaa gaggaggaga 960
tgagagactc tggcatgatc ttttttttgt cccacttggt ggggccaggg tcctctcccc 1020
tgcccaggaa tgtgcaaggc cagggcatgg gggcaaatat gacccagttt tgggaacacc 1080
gacaaaccca gccctggcgc tgagcctctc taccccaggt cagacggaca gaaagacaga 1140
tcacaggtac agggatgagg acaccggctc tgaccaggag tttggggagc ttcaggacat 1200
tgctgtgctt tggggattcc ctccacatgc tgcacgcgca tctcgccccc aggggcactg 1260
cctggaagat tcaggagcct gggcggcctt cgcttactct cacctgcttc tgagttgccc 1320
aggagrccac tggcagatgt cccggcgaag agaagagaca cattgttgga agaagcagcc 1380
catgacagct ccccttcctg ggactcgccc tcatcctctt cctgctcccc ttcctggggt 1440
gcagcctaaa aggacctatg tcctcacacc attgaaacca ctagttctgt ccccccagga 1500
gacctggttg tgtgtgtgtg agtggttgac cttcctccat cccctggtcc ttcccttccc 1560
ttcccgaggc acagagagac agggcaggat ccacgtgccc attgtggagg cagagaaaag 1620
agaaagtgtt ttatatacgg tacttattta atatcccttt ttaattagaa attaaaacag 1680
ttaatttaat taaagagtag ggtttttttt cagtattctt ggttaatatt taatttcaac 1740
tatttatgag atgtatcttt tgctctctct tgctctctta tttgtaccgg tttttgtata 1800
taaaattcat gtttccaatc tctctctccc tgatcggtga cagtcactag cttatcttga 1860
acagatattt aattttgcta acactcagct ctgccctccc cgatcccctg gctccccagc 1920
acacattcct ttgaaataag gtttcaatat acatctacat actatatata tatttggcaa 1980
cttgtatttg tgtgtatata tatatatata tgtttatgta tatatgtgat tctgataaaa 2040
tagacattgc tattctgttt tttatatgta aaaacaaaac aagaaaaaat agagaattct 2100
acatactaaa tctctctcct tttttaattt taatatttgt tatcatttat ttattggtgc 2160
tactgtttat ccgtaataat tgtggggaaa agatattaac atcacgtctt tgtctctagt 2220
gcagtttttc gagatattcc gtagtacata tttattttta aacaacgaca aagaaataca 2280
gatatatctt aaaaaaaaaa aagcattttg tattaaagaa tttaattctg atctcaaaaa 2340
aaaaaaaaaa aaaaaggggg g 2361

<210> 155
<211> 1831
<212> DNA
<213> Homo sapiens

<400> 155
aaaggtgaga atgcacaaag acagctctgg gttgggtacc acagttttgc ttggtagaaa 60
gaaaccagtg taggaaagga gacgccacca gacatcttca acagacaaga ttctttctgc 120
ctttttcaaa agatgctctc tgcagcagta agactataga tagagttgat tggaatatca 180
tgtgacccag tatgctactg ctaggcataa ttatcaaaaa ttcatttttc tcattaaata 240
ttgttaattg ctcgccacat aaagagaagc tagagctcac cagtcttggt ggtgtcctag 300
accttcctct aaagcagtct tgggaagctg gatcatcagw tctttagcct agacagagtg 360
tcgctggtaa ataaaggaga cacaggtaac ccagagtgga cagtgatttg cgtggggagw 420
cacagtggat ctggggcctc tgatactttg yttcckaaaa cagcccccag ttttcggctt 480
gcctatgaga tgatgttcat gtgcttcctt gaaaccaggt ggaaagaaag gggaagaatt 540
aatttctca ttctgttgct gttgaacgta atgtaatctt aatactgtag ccttcctaga 600
agcccttccc tctttttcat gctgtaaagt caaatatttg atatccttaa cataaatttt 660
aaaaattaag gtcattaggr agcaaatgtc tatttccaaa gcaatgagct tgttgtgact 720
gtgattttat tcttctatag tatttttttc ctcattttaa ctgagaggag aaaataatac 780
tcttttgcaa tatccttagg ttctcccctt ccccctggtg ccccttctag tgtcttaaga 840
ctttgtctta acaagtataa cattacattt tgttgttaaa acctttcgaa actgtattca 900
gtgattcttc caagtttatc tgctctgcac tatttcacta ataaaccctg gctaccacgt 960
agcccttgat ctccaagtag tttacctatg caagacctgt gacactctga attcacttct 1020
ctttctttca gaaagtagtc ataaatggag cttaattata aaggtaaaac ttgtctccaa 1080
ccagtttcat tttggccatt tctttttcaa aatgtcagct gttttcctcc aagatttttc 1140
accaaaacaa tgatcataag tgctggaata tataatactt tgcaggcata aaataaccca 1200
gacatactct catatttctt tggtgtattt tggttggtaa aacttaccag cattaaatgt 1260
aaaatataat gaggagttaa ttccttacct agaactattt cttcctttta agattcataa 1320
gtaacctttt atttttacag agctacgtat aacttccaca ttacagtcag ggacctgagg 1380
tgtaacttac taagtgaacc ccaaggttat tttatcttgc aaaagaaacc taaaccaaac 1440
taagggcctt acagtttatg gttagactga atcaaaagct ataacctcaa tttttccaaa 1500
aacagcttct gactgcaaaa gcaagtcata cagttgttag gtatgaaata gcactgatca 1560
ggaaatgcat cttcgcagat ggtatttcct tcagaaaaga cttttctact tttaatataa 1620
attaagccat aacagtttca tgctgtggaa agagggtgaa aaggttcatt ttaagagatt 1680
atataatatg aactttcaca tttactgtga aatgtctaac tttgccagtg cttcagcaag 1740
ttttttttggg ggggtgatgg gggaggggta gtattgggtt ttwggaggkt ttccaaatct 1800
gtggaacttt gggagagggg acagttgttg g 1831

<210> 156
<211> 1186
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1045)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1078)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (1118)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1134)
<223> n equals a,t,g, or c

<400> 156
ggcacgagcg ggcctggccg aggttcgggc tccgttggcc gaggggggcg tacggaggtg 60
gcagctgtgg gaggaggcgg cgtggaaggc cgaggagctc aagcccggac caatccccac 120
gttccgggcc gcgaccctga ccctgcagcg taccgggaag cgaaaccggc cggatgggcc 180
gctgagcccg aatcgggcac tgtgtggagc cccctggagc tgagatcagg atgttccgct 240
tcatgaggga cgtggagcct gaggatccca tgttcctgat ggatcccttt gctattcacc 300
gtcagcatat gagccgtatg ttgtcaggtg gctttggata tagccccttc ctcagcatca 360
cagatggcaa catgccaggg accaggcctg ccagccgccg gatgcagcag gctggagctg 420
tctccccctt tgggatgctg ggaatgtcgg gtggtttcat ggacatgttt gggatgatga 480
atgacatgat tggaaacatg gaacacatga cagctggagg caattgccag accttctcat 540
cttccactgt catctcctac tccaatacgg gtgatggtgc cccccaaggtc taccaagaga 600
catcagagat gcgctcggca ccaggcggga tccgggagac acggaggact gttcgggatt 660
cagacagtgg actggagcag atgtccattg ggcatcacat ccgggacagg gctcacatcc 720
tccagcgctc ccgaaaccat cgcacggggg accaggagga gcggcaggac tatatcaacc 780
tggatgagag tgaggccgca gcgtttgatg acgagtggcg gcgggagacc tcccgattcc 840
ggcagcagcg tcccctggag tttcggcggc ttgagtcctc aggggctggg ggacgaaggc 900
ggaggggcct ccccgcctgg ccatccaggg acctgaggay tccccttcc cgacaktccc 960
gccgytatga ctggtgaggg ccccgggcct caagcctctt ctttgtaaca ggctgagagg 1020
ctgagaaatc aatcccctga ataantttc cctctccgat tccccatccc ccaatttnat 1080
aattaaattt aaacagggaa agccgggccc ccaactgntt ccttgggggt cttnagggga 1140
gaacttttaa cgggaccttt ttccctaact ttttccttct ttaaaa 1186

<210> 157
<211> 1448
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (456)
<223> n equals a,t,g, or c

<400> 157
ggcctgaacc cggggctggt gggcctttct gtgtcctact ccttgcaggt gacatttgct 60
ctgaactgga tgatacgaat gatgtcagat ttggaatcta acatcgtggc tgtggagagg 120
gtcaaggagt actccaagac agagacagag gcgccctggg tggtggaagg cagccgccct 180
cccgaaggtt ggccccccacg tggggaggtg gagttccgga attattctgt gcgctaccgg 240
ccgggcctag acctggtgct gagagacctg agtctgcatg tgcacggtgg cgaraaggtg 300
gggatcgtgg gccgcactgg ggctggcaak tcttccatga ccytttgcct gttccgcatc 360
ctggaggcgg caaagggtga aatccgcatt gatggcctca atgtggcaga catcggcctc 420
catgacctgc gctctcagct gaccatcatc ccgcangacc ccatcctgtt ctcggggacc 480
ctgcgcatga acctggaccc cttcggcagc tactcagagg aggacatttg gtgggctttg 540
gagctgtccc acctgcacac gtttgtgagc tcccagccgg cagcctggga cttccagtgc 600

tcagagggcg gggagaatct cagcgtgggc cagaggcagc tcgtgtgcct ggcccgagcc 660
ctgctccgca agasccgcat cctggtttta gacgaggcca cagctgccat cgacctggag 720
actgacaacc tcatccaggc taccatccgc acccagtttg atacctgcac tgtcctgacc 780
atcgcacacc ggcttaacac tatcatggac tacaccaggg tcctggtcct ggacaaagga 840
gtagtagctg aatttgattc tccagccaac ctcattgcag ctagaggcat cttctacggg 900
atggccagag atgctggact tgcctaaaat atattcctga gatttcctcc tggcctttcc 960
tggttttcat caggaaggaa atgacaccaa atatgtccgc agaatggact tgatagcaaa 1020
cactgggggc accttaagat tttgcacctg taaagtgcct tacagggtaa ctgtgctgaa 1080
tgctttagat gaggaaatga tccccaagtg gtgaatgaca cgcctaaggt cacagctagt 1140
ttgagccagt tagactagtc cccggtctcc cgattcccaa ctgagtgtta tttgcacact 1200
gcactgtttt caaataacga ttttatgaaa tgacctctgt cctccctctg atttttcata 1260
ttttctaaag tttcgtttct gtttttaat aaaaagcttt ttcctcctgg aacagaagac 1320
agctgctggg tcaggccacc cctaggaact cagtcctgta ctctggggtg ctgcctgaat 1380
ccattaaaaa tgggagtact gatgaaataa aactacatgg tcaacagtaa aaaaaaawaa 1440
aaaaaaaa 1448

<210> 158
<211> 1004
<212> DNA
<213> Homo sapiens

<400> 158
ggcagagctc cagactactt taaatgtctc tsctctgact gaattgaagg aattgtaagt 60
ttcagttgct gaatatatca gtatatctga actccggatc tttttatttc ctatttttgg 120
cttcctacat aaattaataa agtctgtcta tatttaaggt ttctgggagt agttttgtct 180
atatttaatc catagatgtg ctcctagtca tcagtcttat ttcagtaaaa ccatctttct 240
ggccaaatct ctaacacgtt ttttacttca gtagtgaggg caatgagaag ctttattaag 300
aaagatccta tttaaagggc taatttggta ttgaaagcat gctgatataa agtccagtat 360
ttgaggatat aaagaggatg tgcactgagc tgtgctgatg ttcagcattt attatacttt 420
aatgggatag tgcttcttga ccattataga acaacaaact gtcaaagggt taatacagat 480
gacccagacc tgacattaaa tcctcttgat tagaaataat taaatgaatt atttattcat 540
ttctctcctc tgccaaatct acttagcccc acaaaaatgc cccagctcag ttaacatttt 600
tttgtttttc actttaggta tctcttaggc aaatagagat ataaattgta ataggaaaca 660
gtctctaaat gtgaggctga atacagcttc agtctggctc tctaatagga caaaagccag 720
tccatgtgtt gtctctmact gatttagctt tttcttttct ttgaacaatt cggcatgaat 780
tgaaaccagg ttttcctgtg gaaagttata gcttgattgg gagatagaag ttgaattgag 840
ttctttcttg caactcttag tgtttatttt tatatctcag taagacgagg ataccttcag 900
tttgaatctg cataatgttc actgccaaac tccttctcat ttaatgctta tggccttcac 960
atttctgtat aataaagatc aattatcagc tmaaaaaaaa waaa 1004

<210> 159
<211> 1509
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1420)
<223> n equals a,t,g, or c

<400> 159

agagagagag actagttctc tcttactcct aggcctttcg gtttgcgcga cgggcaggaa 60
agcgtgcgtg cggctaagag agtgggcgct ctcgcggccg ctgacgatgg aagaactgga 120
gcaaggcctg ttgatgcagc catgggcgtg gctacagctt gcagagaact ccctcttggc 180
caaggttttt atcaccaagc agggctatgc cttgttggtt tcagatcttc aacaggtgtg 240
gcatgaacag gtggacacta gtgtggtcag ccagcgagcc aaggagctga acaagcggct 300
cactgctcct cctgcagctt tcctctgtca tttggataat ctccttcgcc cattgttgaa 360
ggacgctgct caccctagcg amgctacctt ctcctgtgat tgtgtggcag atgcactgat 420
tctacgggtg cgaagtgagc tctctggcct cccctctat tggaatttcc actgcatgct 480
agctagtcct tccctggtct cccaacattt gattcgtcct ctgatgggca tgagtctggc 540
attacagtgc caagtgaggg agctagcaac gktacttcat atgaaagacc tagagatcca 600
agactaccag gagagtgggg ctacgctgat tcgagatcga ttgaagacag aaccatttga 660
agaaaattcc ttcttggaas aatttatgat agagaaactg ccagaggcat gcagcattgg 720
tgatggaaag ccctttgkca tgaatctgca ggatctgtat atggcagtca csacacaaga 780
ggtccaagtg ggacagaagc atcaaggcgc tggagatcct catacctcaa acagtgcttc 840
cctgcaagga atcgatagcc aatgtgtaaa ccagccagaa caactggtct cctcagcccc 900
aaccctctca gcacctgaga aagagtccac gggtacttca ggccctctgc agagacctca 960
gctgtcaaag gtcaagagga agaagccaag ggtctcttc agttaatctg ttgtggcctc 1020
agctgctgag gatggacttg gagaayagct tccaagcttc accttgaaag aagcttacat 1080
ggcagcaata tttctaaaat agtgatacag tcagaggcct cctgtaaggg cgagagaact 1140
gaagttgatg ttgacaggcc cacagggaat tggccttccc tgttcaagtg gaagccagtc 1200
tctgagaatc ccgtgctctc ctctcttttg gtggaggttc tgtaggttca ggtttctacc 1260
atggacttta ggtatatagg gcaagtcagc aagaaagcac cacacactca ggaagccttg 1320
tctacctttc cctagcgtct ctagccagcc agccccagat actcctcaga gacccacttc 1380
tctcttttgc atggaataaa aagcactcac agtgccctgn cttttgggat tacttatggc 1440
tgtggaactt catgaaccca atttcacttt ccttcactgg gttcccaccc cattgttgtc 1500
tctgggatg 1509

<210> 160
<211> 2160
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (470)
<223> n equals a,t,g, or c

<400> 160
gctcgtgccg tggatgcggc tctgcaggat gaagatgaga tacaggtgga tgcatcatca 60
tttgaaagca ctgcaaataa gaaatcctcc tcctcttcct caggaacccc tgcatctcag 120
ctttatccac agtctcgggg gctggttcca aagtaaagcc agcttctcct ctcccagggc 180
ggaaacagca tttgccttct gagagaagag actagcaaaa agctgcagag aggattcggc 240
ccaaactcag aactgttccc ctgaggagaa gcggtggcct ctttgcagat caaccaactt 300
aatctggttg aacgtgctgt tcctaatctg gcactcagcc cctctgggaa acatctttta 360
attagcatct cagaaatgca tgggtaaggt aaagtgcgat agttcaagtg gaaagcaaga 420
gaatgaccag tgaccttgct tccttccccc ttgccttctt ctccccccttn ccctgtgctc 480
cctttctctc ctctctcctt ttctagcctg ttcttwacat ggggctccct tcttgttgaa 540
caatagggca gaatcaggrg tcaccttagc aggaccacat ctttggagcc tcgggataaa 600
atgacagtga ggttgaaaag tgaaaaccct aggaacttga ataggtgcct gttcttgtag 660
ggagaaatga gaaatcgcat ttggatccag gccccaggtg ggcaccatca gcagtcttgc 720
ttccatgcac ctcagtaaga agtggatctg cctttgggac ctgctcagtg aggaaatctc 780

ttccaatttc tgcttctgaa tgattcaatg ttgggagcaa tagaaataac attccctttg 840
ccttctctga gtgtttaggg aaatagcttc tttaaaacct caaaaccatg accatcctgt 900
caaagaccta agtctgtaag ctggtgccat gtccatacac catgtcactt tactcttcat 960
ttgtcaccat cttttcccat gcacgcatac tctgaacatc cttgtgtggg cccatcctct 1020
gcatccagag catgctctgc agtgggcctg ttttgtggaa gaaaggaggc tgtctctgcc 1080
ttctctgatg ggactggagt tgagggaagg agctgtattg tggcacttct gaattccccg 1140
ttttgttcca tattggtata gagagcagaa gagtagctag gcagatgcag agatggagac 1200
atgagactca gtgcagtggg cagggaagac ataacagatg gaagcaaagg aatcctgcct 1260
gccttcagca gagaattcac cgaatcctag aactgtggct ccctccaggc agagcctaag 1320
atgctggtga agaatagctg tgtgattgaa taggctcaaa ggagagttca gaattcccat 1380
ttacatatta ctagtttggt ttgtaagttt tagttccttg tattattgag attcagagct 1440
tcattttatg ttggtcatta ggtgaatatt actcattttc cctcaagaga agctcataag 1500
tgtgtgtggg tgtgagagca cgatggtgcc tgtgttctgt gaatgtgtcc atatgtgtct 1560
gtaagagaga cagagaccaa gaacttgccc aattttagaa atacactaat gtgcagttgt 1620
tgccttttgt ctgtattgaa ggcccattga atgactaatc caggctggaa gcattcccat 1680
gtgggtgtct gagtccatga gccaagcctg aggggacagt gagtctccag gtctgccaca 1740
ctggtgcacc ttgctggcac ggtgcctcag gaaggtggcg actcargtgg gccttgagtt 1800
atattttaac tcagctgctc agttcccagg gcacatttct ggatcagaac ccatgggaaa 1860
caggaggtac taagtgcaat gtcttagcat tctgcaaaat ggagatctgt tgtccagcgg 1920
cttatctcct ttttagtaac ccttctttct gaacccaggg ccctttttcag ccttccctca 1980
tattttcttg agatcaaact ttacttcttt cttatttact aagaatttgc ctgtttgaat 2040
aagaacaaaa cgctaaggtg ggtagcctaa gctgattttc tgctggttac acgtgtctct 2100
cacaccacat ttcctcaaag ctaatctgaa ttctgtaggc taaaaatatt catgtagcaa 2160

<210> 161
<211> 3609
<212> DNA
<213> Homo sapiens

<400> 161
ctggtaatcg aaaatgttaa catgcctgag sagattgtta ttcacgcact gcagtgtact 60
cactatgtaa tcctttggca acttgctaag ataactgaaa gcagctctac aaaggaggac 120
ttgctgcgtt taaagaaaca aatgagagta ttttgtcaga tatgtcaaca ttacctgacc 180
aacgtgaata ctactgttaa ggaacaggcc ttcactattc tgtgtgatat tttgatgatc 240
ttcagccatc agattatgtc aggagggcgt gacatgttag agccattagt gtataccccт 300
gattcttcat tgcagtctga gttgctcagc tttattttgg atcatgtctt cattgaacag 360
gatgatgata ataatagtgc agatggtcag caagaggatg aagccagtaa aattgaagct 420
ctgcacaaga gaagaaattt acttgcagca ttttgtaagc taattgtata tactgtggtg 480
gagatgaata cagctgcaga tatcttcaaa cagtatatga agtattataa tgactatgga 540
gatatcatca aagaaacaat gagtaaaaca aggcagatag acaaaattca gtgtgctaag 600
acccttattc tcagtctgca acagctttta atgaaatgat acaagaaaat ggctataatt 660
ttgatagatc atcctctaca tttagtggca taaaagaact tgctcgacgt tttgctttaa 720
cttttggact tgatcagttg aaaacaagag aagccattgc catgctacac aaagatggca 780
tagaatttgc ttttaaagag cctaatccgc aaggggagag ccatccacct ttaaatttgg 840
catttcttga tattctgagt gaattttctt ctaaactact tcgacaagac aaaagaacag 900
tgtatgttta cttggaaaag ttcatgacct ttcagatgtc actccgaaga gaggatgtgt 960
ggcttccact gatgtcttac cgaaattctt tgctagctgg tggtgatgat gacaccatgt 1020
cagtcattag tggaatcagc agccggggt caacagtacg gagtaaaaaa tcaaaaccat 1080
ctacaggaaa acggaaagtg gttgagggca tgcagctttc actcactgaa gaaagtagta 1140
gtagtgacag tatgtggtta agcagagaac aaacactgca cacccctgtt atgatgcaga 1200
caccacaact cacctccact attatgagag agcccaaaag attacggcct gaggatagct 1260

tcatgagtgt ttatccaatg cagactgaac atcatcaaac acctcttgat tataatcggc 1320
gtggcacaag cctaatggaa gatgatgaag agccaattgt ggaagatgtt atgatgtcct 1380
cagaagggag gattgaggat cttaatgagg gaatggattt tgacaccatg gatatagatt 1440
tgccaccatc aaagaacaga cgagagagaa cagaactgaa gcctgatttc tttgatccag 1500
cttcaattat ggatgaatca gttcttggag tgtcaatgtt ttaataccag tacacaatta 1560
aatctgtggt gaagtcattt tctaagtgga agaggaaatt ttaaagtgtg gtagatacag 1620
tgaaattctg tacagatttt tctctaagga gaatatgaca tgcttatgct taccaagatc 1680
aagtgcattg aggggcagtt ttgtttgcct gaataaacgt aaaggacaag taaacaattt 1740
gatgataagc tacagttttt cttagaaagt aaatatttta tttatgcgct gttagttggc 1800
ttttgaatcg attatttcat gctttttttt aaaaaaaaaa aaaacaaaat aacaatctga 1860
agaggcattt ggtacagata tgaattctct tacatttatt tactggttgt actaaataat 1920
gatgacctct gctggatttc tgtttacatc cagaaaacaa tgttaaggat gtatttattc 1980
ccctaccctg aagaaagtgt aggatagaat tgtttttagc attctaaatt taaatgctta 2040
aaacgtcaat caacaaaact ttgttttaaa tattgtaatt gtggagaaaa gtaaacttat 2100
aagcagaact tttacaattt tttcatctaa aagtatttta agatattttt aaaatccaag 2160
agcttctcta tacttttcag aaatatccag atgcagtgaa ctgccagaag gtaaccagtc 2220
tcaaacatgc ttatcccatt atcaaccctg aaagtttgct tgtcctttaa gataaaaatg 2280
taatgttgtg atattccttc cagtaatgcc actgtatttt gtctccaaat aaaagaagct 2340
tattgtagta tgtttgcaga aaaattctaa acaaaaatta tacagcttat tagagtgtgg 2400
gaatagggat ctaaatttta aataaaatta tatatatata taaattggtg ctgattttat 2460
aattgcgcag tttgtttagt tttttcttac ttttaaattc caacttaaaa ttatgaggtt 2520
tcagaaatat attgaaagtt taacaatgtt taaaaataga aaagcatgag tgttcatgct 2580
ttaaaatgat ttttaaattt gtattttata ttgttttatc tatctgtctt tgcaagcagt 2640
cttcaggtta aagatacttc taacaggtta cagtacattt cctctgtatg taaattagat 2700
gggataatag aattcataac ccataatatt ctttgaaagc taagctttaa acttcatttt 2760
atgtcctttc acaaataaat tagtttaaaa cagaaagtgg ctacttgcca ttttgacatc 2820
aactcatttt gcgaggctta ggcagctaga catcgtttaa aacaaaatat taacttatat 2880
tacatgtgta tctatctatt gtcagtcgtc tctcagttct tgaggtatat tattttaatc 2940
attccatgcc ttaatatgct tgcaatacaa gaatatcttc agatgggtga ataccaaaag 3000
gctttcagtt tttagtcaga aatcaagcat tgggctgtgg tagccaaaaa ccataggtta 3060
gctaaaaaga tcatgataca attattttat taagtcatgg ttaataacaa atgaatccag 3120
acttgtctaa cagattttcc atcaacaaat attgttatgt gcaaaagtat tgcctatgtt 3180
gttttacaca ccactgcatt aactagaact gctgagagga ctgtatatat gattttaaac 3240
ctaagttgat tttttttctc actcttgaaa ggagtacttc tttgtgaaag cagttcttac 3300
agctttgttt tcaaccagct aaaaatgttt tatatattac tctaacctgt tgtcctccac 3360
attctattgt cctaattgta ctgttttctg atttgtattt atgtcttgag acagtaactt 3420
tttgaataaa aataaaccta cagtatgttg tatgttttct cttgtactca aagggggagg 3480
gtggctataa atggtttgca aatttatatc tattatcaca tcttttaatg tgtttgggga 3540
ataatttata gagaatacca tcagtttata tttttaataa atcatatgta tttacaatga 3600
aaaaaaaaa 3609

<210> 162
<211> 1603
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1600)
<223> n equals a,t,g, or c

<400> 162
gttcaggaga gatcacgctg ctgccctccc gggacaaccc ccgtcgcctg cgcgtgctgc 60
tgcgctacaa agtgggagac caggaggaga agaccaaaga ctttgccatg gaggactgag 120
cgttgccttt tctcccagct acctcccaaa gcagcctgac ctgcgtggga gaggcgtagm 180
gagtcggagg ggaaagggag atcccacgtg caagtagggg gaatatctcc cccttttccc 240
tcatagcctc tagggaggga gagtgacttc attctccatt tkaagagatt cttctggtga 300
tgtttactta aaaagtgatc cccctcaaca acggatacag cgtgcttatt attgggcatt 360
tagcctcaaa agcatgtagt accaagcact tgtatttccg tatattttgt ttcgcggggg 420
agtgaggggg aagaacacgg atgaaaatgt cagtttttga agggtccatg cacatccctg 480
acacctcaca ccttatctaa gtctgaagct ggggagaaag gggttcattt agacttcata 540
catttccagt acgactttag tatctctcca gagccatatt ttctcagtcc gaattaattc 600
cccctcccta ggtgcctgta ggctatggta cttcttcctc attgttttct aggtaaactt 660
cactactggt aattaagggg aaggatatga ggaagcagtt taaatagccc tgttctcatt 720
actctgacca catacatcat agggtgctaa agttgatgaa cacattaatc cgttaagtaa 780
aatggacttt gtaattgtac agcataccta agaaactcag aaggtgcatt taagagagag 840
acctgaaaga aatagtatgg atttttaaaa attcttgtct ctactattat aaccaaaaaa 900
tatttcttgt atgtcccata aaaatatttg kgtaattctt atgaaacagg ctggtagagg 960
aggtttctga gcctagccca agggcttatt catcaccatg ggtaaattat ttaaactcac 1020
ttaattaagg aaaatatttt cccagctaga aaagtatact cattctcatt taaactctct 1080
catttggagg gatcatgtga gttggcctac ttacaagtag tgaaagttcc cttttcagtt 1140
ttgttttgtt ttgttttgtt tttctctttc actcagccaa atgtgaaagt tgtgaattta 1200
ggaaaatcac ttgtaatgaa gtgtgaatct tgttatcaaa tttatttctc tgatgtttcc 1260
ttccttatcc ttgtagccaa taaaacattg acattctcac gttttataga tgaggtaaaa 1320
agtcttgtgt gctgtgagtt ataatgcttt tgccttttta atattattag ttcttaagtg 1380
ttacagcccc ttcagaatat aacttcagga caattcaaac tatgcttaat gtatgatttt 1440
cgagcttctg tatgctaaga aaataggtgt gaaaaactgg tgttctgaaa tagcctaaca 1500
tttattgtaa ttctgaattt tctgcccttt tattcattgc atattaaagt attagagtat 1560
aaaaactaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaan ccc 1603

<210> 163
<211> 853
<212> DNA
<213> Homo sapiens

<400> 163
gaataaaccc aacctacaga gcatcatagc ttagcctagc ctgctttaaa tgtgctcaga 60
aaacttccat tagcctgcaa ttaggcaaaa tcatcaaaca taaaaccatc aaacataaaa 120
tatttataaa gtgttgaata tctcatatag tttattgaat acctgcatcc aaaagatgct 180
ggcaacacag cacactttag agcattggtt gtttactctc ttgatggtat ggctgcccag 240
catcaagagt tatcatactg caaatcgata gcccaggaaa agagcaaaat tcaaagttca 300
aagtagagtt tttactgaat gcttgctttt gcaccgtcgt aaagttgaaa agaatttaaa 360
ttgaaccatc ataagctgca gactgtgcat tttatattga aaagttaata tttttaattt 420
ttaatgcaga gaagtaccca aagcataaga acacaacaca ttttcacaaa gcaaacacag 480
ccatggaacc agcacccata tcaactaaca aaatactagt ttgggctttt ttgtacttta 540
tacaaatgga ctcatataat gttcatcttt tgggtctgcc tgctttcatt caatattagg 600
tttgtgggtt catctctgct gtgtgtagtt ctttcctgtt ctttatacag tgttccaaag 660
tatagtatat tacagtttac ccattctact cttgatagta aatgttttca catttgggct 720
attacaaata gtgctgcagt gaacattcac atacacatct tttggtgaac atgtgttaca 780
tttccaagta caattgctgg gtgatgagta tgcatactct taaaacatgg ttgtaccaat 840
ttacacctct acg 853

<210> 164
<211> 1917
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1433)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1856)
<223> n equals a,t,g, or c

<400> 164
gcccacgcgt ccgcggacgc gtgggaaact tttgtaaaaa aagtttattc ttaaatgtac 60
aacagctcca agacaacatt aattccagct atacgagaag tttcttcaca ggtataagat 120
gatctctgaa ttcacctggc ccaaccatga ccttccttca gacaaagagg ctgtcaagaa 180
actaattgaa cggtgtggtt ttcaggatga tgtagcttat gggaagacca aaattttcat 240
tcgaacaccc cgaacattgt ttaccttgga agaactccgt gcccagatgc tcataaggat 300
tgtcctcttt ctacaaaasg tgtggcgggg caccckggcc cgcatgcggt acaaaagaac 360
caaggcagct ctgacaataa tcaggtacta ccggcgctac aaagtgaagt cgtacatyca 420
cgargtggcc agacgcttcc atggcgtcaa gaccatgcga gactacggga agcacgtgaa 480
gtggccaagc cctcctaaag ttcttcgccg ttttgaggag gccctgcaga cgattttcaa 540
tagatggaga gcatcccagc tcatcaagag cattccggcc tcagacctgc cccaggtcag 600
ggcaaaggtt gcagccgtgg aaatgttgaa gggtcaaagg gctgacctcg ggctccagag 660
ggcctgggag ggcaactatc ttgcttcaaa gccagataca cctcagacct caggcacttt 720
tgtccctgtt gctaatgaat tgaaacggaa ggacaaatac atgaatgtcc tcttttcctg 780
tcacgtccgt aagtaaatcg atttagtaag gtggaagaca gagcaatttt tgtcactgac 840
cgtcacctgt ataaaatgga tcccactaaa cagtacaagg tgatgaagac tatccctcta 900
tacaatttga ctggtctgag tgtctccaat ggaaaggacc aacttgtagt gttccatacg 960
aaagacaaca aagacctcat tgtctgcctc ttcagcaaac agccaaccca tgagagtcga 1020
attggagaac ttgttggagt gctggtgaat catttcaaga gtgagaagcg ccaccttcaa 1080
gtgaacgtca ccaacccagt acagtgcagc ctgcacggga agaagtgcac cgtctccgtg 1140
gagacgcggc tcaaccagcc ccagcccgac ttcaccaaga atcgctcggg cttcatcctc 1200
agcgtgcccg ggaactgacg ccccgcggag gcctggcccg gagcccggcc acactccgag 1260
tcctgggtcc cagtccagct gctgcctccc aacccatgcc cgctagaaac ctgctgcgag 1320
ggcccctccc agaggagccc cgcccctgta agatttcctt cctggttttc tgcctttggt 1380
atcatcttcc tctgtcctta ctgtccacgg tccctgttca ataagccaaa gancctggtg 1440
ccccgcccag accccctggc tgacgtccag accaatctca ccccarargc aactggatgg 1500
tgcctttagt tggtgcggat gccccgtggc aggtcaagtc agagcacctg gacaggtgtc 1560
ctccctgctg ctgaccctgc agagggaagg ggtggggatg caggaccccg ctctgcggga 1620
gccccatagc cacctctytt gcccaaggtg agccagccct ggggacccag ctcagggagg 1680
ctctgctcag agttcggcgg acccacccca acccaactcc cagccgccag ccaaagccac 1740
tgggtgagca gagtcaccca cagggccagc ccctcagcca ggagccagtg gaggagcgga 1800
acagcccatc cagcagagtg agtccatcct tcccaggttc tcccctggga gactcncttt 1860
gccaccaagg cccccaccag ggctctgacc accgctctgg agaggacagt gtggcat 1917

<210> 165
<211> 2420

<212> DNA
<213> Homo sapiens

<400> 165
gcacctccgt gcgcccggtt gcagcgtgga cgccggatga gttgctttta ggcttgctgg 60
cccgcggggc tgtccaggca cgcgaggccc ctcagcaaca aaatgcttca acaagttcca 120
gaaaacataa attttcctgc tgaagaagag aaaatcttgg agttttggac tgaatttaat 180
tgttttcagg aatgcttaaa gcaatcaaaa cataaaccaa aatttacctt ctatgatggt 240
cctcctttg caactggact gcctcactat ggacatatac ttgcgggtac aattaaagat 300
atagttacaa gatatgctca ccagagtggg tttcatgttg acagaagatt tggatgggat 360
tgccatggct tacctgtgga atatgaaatt gataagacac tgggaatcag aggaccagag 420
gatgtggcca aaatggggat tacagagtat aacaatcagt gccgagcaat tgtgatgaga 480
tattctgctg agtggaagtc tactgttagc agacttggcc gatggattga ctttgacaat 540
gactataaaa ctctgtatcc acaattcatg gaatcagtct ggtgggtctt caaacaactc 600
tatgataaag gccttgttta tagaggtgtg aaagtcatgc ccttctctac ggcatgtaac 660
actccacttt ccaacttcga gtcacaccag aattataagg atgttcaaga tccttcagta 720
tttgtaactt tccctttgga agaagatgaa actgtatctt tagttgcttg gacaaccact 780
ccctggactc tacctagtaa ccttgctgtg tgtgttaatc cagaaatgca atatgtgaaa 840
attaaagatg ttgccagagg acgattactc attttaatgg aagccagatt gtcagccctc 900
tataaattgg agagtgacta tgagatcctt gaaagatttc ctggtgccta tcttaaaggc 960
aagaagtaca ggcccctgtt tgactatttc ctgaagtgta aagagaatgg cgctttcact 1020
gtgcttgttg acaactatgt gaaggaagaa gaaggcacag ggttgtcca ccaagctcct 1080
tacttcggtg ctgaggacta tcgggtctgt atggacttta acattattcg gaaagactca 1140
ctccctgttt gccctgtgga tgcttcaggc tgcttcacaa cggaggtgac agatttcgca 1200
ggacagtatg tgaaggatgc tgacaaaagt atcatcagga ctttgaagga acaaggccga 1260
cttctggttg ccaccacctt cactcacagc taccctttt gctggagatc agacactcct 1320
ctaatttaca aagcagtgcc cagctggttt gtgcgagtgg agaacatggt ggaccagctc 1380
ctaaggaaca atgacctgtg ctactgggtc ccagagttgg tacgagaaaa acgatttgga 1440
aattggctga aagatgcacg tgactggaca atttccagaa acagatactg ggcaccccc 1500
atcccactgt gggtcagcga tgactttgag gaggtggtat gcattgggtc agtggcggaa 1560
cttgaagaac tgtcaggagc aaagatctca gatctccaca gagagagtgt tgaccacctg 1620
accattcctt cacgctgtgg gaagggatcc ttgcaccgca tctctgaagt gtttgactgt 1680
tggtttgaga gtggcagcat gccctatgct caggttcatt acccgtttga aaacaagagg 1740
gagtttgagg atgcttttcc tgcagatttc attgccgagg gcatcgacca aaccagagga 1800
tggttttata ccctgctggt gctggccacg gccctctttg gacaaccgcc tttcaagaac 1860
gtaattgtga atgggcttgt cctggcaagt gatggccaaa aaatgagcaa acggaaaaag 1920
aattatccag atccagtttc catcatccag aagtatggtg ctgatgccct cagattatat 1980
ctgattaact cccctgtggt gagagcagaa aacctccgct ttaaagaaga gggtgtgcgg 2040
gacgtcctta aggatgtact gctcccatgg tacaatgcct atcgcttctt aatccagaac 2100
gttctgaggc tccagaagga ggaagaaata gaatttctct acaatgagaa cacggttaga 2160
gaaagcccca acattacaga ccggtggatc ctgtccttca tgcagtctct cattggcttc 2220
tttgagactg aaatggcagg tgagtctctc ttggtctgtc ctcccaggaa taaggactat 2280
tctctttgta ackgcccttt tgatatttaa tagtggaaat attgagagat acagamaatt 2340
aaataattgt ttccttttac ctctcatata gttttgttaa ggcttgttaa ttgtcgtgat 2400
atctttgttt aagacctggg 2420

<210> 166
<211> 2061
<212> DNA
<213> Homo sapiens

<400> 166
gccggcaccg cagcagcccg aggagggcgc gggcrcgrgg cccggtgcgt gcagcctgca 60
cctcagcgag cgcgccgact ggcagtactc gcagcgcgag ctggacgccg tcgaggtctt 120
cttctcgcgc acggcccggg acaaccggct cggctgcatg ttcgtgcgct gcgcgccctc 180
cagccgctac acgctgctct tctcgcacgg caacgccgtg gacctgggcc agatgtgcag 240
cttctacatt ggcctcggct cccgcatcaa ctgcaacatc ttctcctacg actactcggg 300
atacggcgtc agtcgggcaa gccctccgag aagaacctct acgccgacat cgacgccgcg 360
tggmaggcgc tgcgcacccg gtatggcgtg agtcccgaga acattatcct ctatggtcag 420
agcattggga ctgtccccac ggtagacttg gcctcgaggt atgaatgcgc agggtaattc 480
tccattcccc tctgatgtct ggtttgcgtg tggctttcc ggataccagg aaaacatact 540
gctttgatgc tttccccagc attgacaaga tatctaaagt cacctctcct gtgttggtca 600
ttcatggtac agaggatgag gtcatcgatt tctcccatgg cctagcgatg tacgagcgct 660
gtccccgagc cgtggagccc ctttggkttg aaggggctgg gcataatgac atagagcttt 720
atgcacaata cctagaaaga ctaaaacagt tcatatctca cgaacttcct aattcctgaa 780
gacaacaact tgatcttacc tcatttactg tgaacagaag agtcctctgt tttgcacatg 840
ctttaactgg gtagctgtaa aggcttgata accatgaaga agtgcccaac ctttagggtg 900
ttctaatcaa agagctgatg aaatctcagt cttttgtatc tagaggtggt tctgctaatt 960
cacacaacac gttaaactga acagtcgtga ttcccagctt cattaccttg caggaatggg 1020
aatgagagct gaatgtaggg acaattttct agtgctgtat aaagtagcct cgcatctgtt 1080
tctcaacctt atccatcatt tctgacattc atgcaggact tgccctgttg ccaccaatgt 1140
tctcggtatt tcacatgcag ctctctttct gccactggat acatgggttc aatccatttg 1200
tgaagctgtg atagtgtaac tggaaagcta gtgtggtgaa aattccttta ttatttttg 1260
ttaacatgct gatctttccc ggacaaatga actgaagggt aatttactgg aactctcgtg 1320
tacagcttca tcaactgtaa ccatataaat ataactggaa tattcttaaa caaaaagaaa 1380
ctaggggttt ttttaagtgt aaatttatta ctagccaaca gagttttact attttgattg 1440
tctggttggt ttaacaaaga gcctagctga ctttccttct gtaaagtcct ccttgtaggc 1500
ttttttaaag tactgtacat atttgcaatc acattgtgca tagattctta atggtagata 1560
tgatttcttt tgtcaggcta caacaatgaa ctgcagattc cttgtttgta atgtaaatga 1620
ttgaatacat tttgttaata tgtttttatt cctatgtttt gctattaaaa attttataac 1680
atttccaaga caaaaattcc aagtttatgc tttgaagaat ttatgtaatt aaaatttcac 1740
taaactaatc tttttagttt aggaattatt tgggttttga cactggaagt tgcgccaaat 1800
aagcatcaga aataggagat gcttaacatt gctatactac ttgtgttggt taggggtttg 1860
gatttggggg ttctttggtt ttaatttttt tttccacatt taaaagcctt aaatgtactg 1920
taagcctcag atcgttgtac aactggactg cggttgattg ccagtttgtg tactgttgct 1980
tggatgcggc acagtggttg gtaatggaat aaaggatgca tggatcagaa aaaaaaaaaa 2040
aaaaaaaaaa aaaaaaaaaa a 2061

<210> 167
<211> 2567
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (55)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (74)
<223> n equals a,t,g, or c

<400> 167
ggagaaggcg gcggtnggcg gcgtggacgg cccgcagcgg gacggccgcg gcganggcgg 60
acagccgggc gcancggcgg yacaggggcc cccgccggcg cctcagctca cagagacgct 120
gggcttctac gagagcgacc ggcggcggga gaggcgscgg gccgcacaga gctttcattg 180
ttgaggttcc tcagtgctga actaacaaga gggtacttcc ttgaacataa tgaggccaag 240
tatacagaaa gaagagaaag agtatacact tgtttgcgaa taccaagaga attggaaaag 300
ctgatggttt ttggaatctt tctgtgcctg gatgcgtttt tgtatgtgtt caccctgctt 360
cctttaagag ttttcctggc actattcagg ctcctcactt tgccttgcta tggcttaagg 420
gacagacgtt tgcttcagcc tgcccaggtg tgtgacattt tgaagggtgt cattttggta 480
atctgctatt ttatgatgca ctatgttgac tactccatga tgtaccacct gataaggggg 540
cagtccgtca tcaagctcta catcatctac aacatgctgg aggtagctga tcgtctgttt 600
tcatcttttg gacaagacat attagatgct ctctattgga cagcaacaga gcctaaagaa 660
agaaaaagag cccacattgg ggtgattcct cactttttca tggctgttct ctatgtcttt 720
ttgcatgcaa ttcttataat gsttcaagca acaactctca atgtagcttt taactcacac 780
aacaagtctt tgtctactat catgatgtct aataatyttg ttgaaattaa aggaagtgtt 840
ttcaagaagt ttgaaaagaa caatctcttt caaatgtcaa atagcgatat taaggaacga 900
ttcacaaayt atgtgctytt actgatagtg tgtctaagaa acatggaaca gttttcttgg 960
aatccasatc atctctgggt gttgtttcca gatgtctgta tggtaattgc atcagaaatt 1020
gccgtggata ttgtaaaaca tgcctttatt actaaattca atgacattac tgcagatgtc 1080
tacagtgaat atagagccag tcttgctttt gaccttgtta gcagccgaca gaaaaatgca 1140
tacactgatt acagtgactc tgtagcacgg aggatgggct ttattcctct cccactagct 1200
gttttactca tcagagttgt aacaagctca attaaagtgc aaggaatcct gtcttatgcc 1260
tgtgtcatac tcttctattt tgggttgata tccctgaaag tacttaatag catcgtgctg 1320
ttggggaaat cgtgccagta tgtgaaggaa gccaaaatgg aagagaagct gtcgaatcct 1380
cccgcaacct gcactccagg caagccgtcc agtaaatcac agaacaaatg taaaccctct 1440
caaggccttt ccacagaaga aaacctgtct gcctccatca ccaaacaacc tattcatcaa 1500
aaggaaaata tcataccatt acttgtgaca agcaattctg atcagttttt gacaactcca 1560
gatggtgacg agaaggacat aacgcaggac aattctgaat taaaacacag atcctcaaag 1620
aaagatttgt tagagataga caggttcaca atttgtggaa accgaattga ctgaatctgt 1680
ggcttcatgc gctgaagaag ctgggtcctg gggcaacaag tgctgtgttg ccaggacaaa 1740
tagatgctaa acatggcact taaatattta tttaaaaact taaattatta ttggcaagca 1800
aatcttagta tctttcttcc agtaatatgg cctggctgag ggtcagacca caggacagga 1860
gcgacctccg gccttgactg tctgggaagc ttgatggatt ataaaacttc ctcctgcctg 1920
gccaagcagc agcatcattt ccaggaccca acaaaggcaa catcaaaatc tgttttgctt 1980
tgtcagtctg ggcttccaga atgttgaatt tgcctcaagg cctcttcagt ataaggaaat 2040
acctggaaaa ctgtgaaact tttaccacga cgtaatcttt ccagtctcat actattttca 2100
caaacagttt tcaaacgtta cttcatctgc caaagcatta aaaaaattaa acataagtca 2160
agataaatgt tcttaccacc agaataaccc ttaaagatgt atcttaatta atcagaataa 2220
aaggctacct taaataagac atgatgaata gtagcatttt gtagggttaa aaaaaaaatg 2280
ctaaactagt ttatttatta aaaaaataat taatgaaggc tatgcattac tgggaaaaat 2340
ccttcataat ttttcagttt actctttaaa gcaaaatgtg agctgtatgt catttaattg 2400
gtggataaaa caaatttcct tacaaaaggg cactttttac accaaggaag cagagcagtg 2460
ttaactttaa ggtatactta actgattttg ctttaaaact aattacytcc mtaaattatt 2520
acmgctaaag ggttycgrtg ttggarccgg gcyggaaaat tgtccat 2567

<210> 168
<211> 2324
<212> DNA
<213> Homo sapiens

<400> 168
cccacgcgtc cggtccttcc ggtatcgcgt tgctcagggg cttttcaacc ctctgtcagt 60
cggcgatcgc aagcaggctc ttctaagttc ccgacgcctc ttggcccgga aaactccggg 120
aaccccacac tgctttcctc tgcccagccc gagactcggg tcagttactg gacgaaactg 180
ctctcccagc tccttgcgcc gctccccgga ttgcttcaga aggtgctaat ttggagccaa 240
cttttcggtg gaatgtttcc gaccagatgg ctagattttg ctggagtcta cagcgccctg 300
agagccctga agggacggga gaaaccagcc gcccccacag cgcagaaatc tttgagttcg 360
ctgcagctcg actcctcaga cccctcggtc accagtcccc ttgattggct agaggagggg 420
atccactggc aatactcgcc cccagaccta aaattggagc ttaaggccaa gggaagtgct 480
ttggaccctg cagcacaggc ttttctctta gagcagcagc tgtggggagt ggagctgttg 540
cccagtagcc ttcaatcccg tctgtactct aaccgggaac ttggctcttc gccctctggg 600
cttctaaaca ttcaacgcat agacaatttc agtgtggtat cctatttgct gaacccttcc 660
tacctggact gctttcctag gctagaagtc agctatcaga acagtgatgg aaatagcgag 720
gtagtcggct tccagacact aaccccagag agcagctgcc tgagagagga ccattgtcat 780
ccccagccgy tgartgcaga actcattccg gsctcgtggc agggatgtcc acctctttct 840
acggaaggcc taccagaaat tcaccatctt cgcatgaaac ggctggaatt ccttcaacag 900
gctagcaagg ggcaagatwt acccacccct gaccaggata atggctacca cagcctggag 960
gaggaacaca gccttctccg gatggatcca aaacactgca gagataaccc aacacagttt 1020
gttcctgctg ctggagacat tcctggaaac acccaggaat ccactgaaga aaaaatagaa 1080
ttattaacta cagaggttcc acttgctttg gaagaagaga gcccttctga gggctgtcca 1140
tctagtgaga tacctatgga aaaggagcct ggagagggcc gaataagtgt agttgattac 1200
tcatacctag aaggtgacct tcccatttct gccagaccag cttgtagtaa caaactgata 1260
gattatattt tgggaggtgc atccagtgac ctggaaacaa gttctgatcc agaaggtgag 1320
gattgggatg aggaagctga ggatgatggt tttgatagtg atagctcact gtcagactca 1380
gaccttgaac aagaccctga agggcttcac ctttggaact ctttctgcag tgtagatcct 1440
tataatcccc agaactttac agcaacaatt cagactgctg ccagaattgt tcctgaagag 1500
ccttctgatt cagagaagga tttgtctggc aagtctgatc tagagaattc ctcccagtct 1560
ggaagccttc ctgagacccc tgagcatagt tctggggagg aagatgactg ggaatctagt 1620
gcagatgaag cagagagtct caaactgtgg aactcattct gtaattctga tgacccctac 1680
aaccctttaa attttaaggc tccttttcaa acatcagggg aaaatgagaa aggctgtcgt 1740
gactcaaaga ccccatctga gtccattgtg gccatttctg agtgtcacac cttactttct 1800
tgtaaggtgc agctgttggg gagccaagaa agtgaatgtc cagactcggt acagcgtgac 1860
gttctttctg gaggaagaca cacacatgtc aaaagaaaaa aggtaacctt ccttgaagaa 1920
gttactgagt attatataag tggtgatgag gatcgcaaag gaccatggga agaatttgca 1980
agggatggat gcaggttcca gaaacgaatt caagaaacag aagatgctat tggatattgc 2040
ttgacatttg aacacagaga aagaatgttt aatagactcc agggaacatg cttcaaagga 2100
cttaatgttc tcaagcaatg ttgagttggc agcctgtagt cctagctagc atacactacc 2160
tcttacctga gaggtgtctt ttaaaaacaa atcttggcag ctgtcctttg acattttttt 2220
tttagrggaa tgtaactggm ctrgtaattt ttttttttgc aacatatccc cactccagaa 2280
acattccagg tttgaagcca gccctggata atgaaggatg aact 2324

<210> 169
<211> 1784
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (200)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (215)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1759)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1778)
<223> n equals a,t,g, or c

<400> 169
```
gagaattacc ttcagctgta tcaattacag tacacaggaa ttgttacgat ttcctaaact 60
tcatgatgcc atagttgaag tggtgacttg tcttcttcgt aaaaggttgc ctgttacaaa 120
tgaaatggtc cataacttag tggcaattga actggcttat atcaacacaa aacatccaga 180
ctttgctgat gcttgtgggn taatgaacaa taatntagag gaacaaagga gaaacaggct 240
agccagagaa ttaccttcag ctgtatcacg agacaaggtt gcatctggag gtggtggggt 300
tggagatggt gttcaagaac caaccacagg caactggaga ggaatgctga aaacttcaaa 360
agctgaagag ttattagcag aagaaaaatc aaaacccatt ccaattatgc cagccagtcc 420
acaaaaaggt catgccgtga acctgctaga tgtgccagtt cctgttgcac gaaaactatc 480
tgctcgggaa cagcgagatt gtgaggttat tgaacgactc attaaatcat attttctcat 540
tgtcagaaag aatattcaag acagtgtgcc aaaggcagta atgcattttt tggttaatca 600
tgtgaaagac actcttcaga gtgagctagt aggccagctg tataaatcat ccttattgga 660
tgatcttctg acagaatctg aggacatggc acagcgcagg aaagaagcag ctgatatgct 720
aaaggcatta caaggagcca gtcaaattat tgctgaaatc cgggagactc atctttggtg 780
aagagaacta tgtaatactg agactttgtt gactcaaaac ttgctagtta ctgcctacct 840
gagtagaatc ttatttatga actcctgtgt attgcaatgg tatgaatctg ctcatgtgga 900
gactggctat aaactgaaaa gtgtattcca aattgcagaa cacatcacac atttaatcca 960
aataataaat ggctgtttct aaagtttccc agtatatata aaatacatca agtctgtctt 1020
gtgacagttt catctgaact taacttaaaa acaactgtta atgttctagt tgtgcaaagc 1080
agtttgcctg tggataagat gacctgtgta ataatctttg ttagtagtct taaagctgct 1140
gccatagtcc tccaagaaga aagcaccaag acaacatttc atatgactat aatgcatgta 1200
ctatataagc tgatctggct ttgaaagatg tgagttggca agttcctcac atagagtcat 1260
tgtattccac ctgtccttca atttagtttt ttctgagctt ctttgcagcc tttgatgtgt 1320
ttttaagaaa gctgaatgca caagaggatc tgtgacactg acatggctgt ggtgtgcata 1380
ctgtgtagtt acatagccct tccaattctg ggtccatttg cactagcaaa ttaaaatatg 1440
ctttgattca tacttaaacc tgaaagcagg aatgcctaca ttaattccta cattaaaaac 1500
agccatctac ccttgattat ctagwaagac ttggtaatga tggtcagttc cttttagatt 1560
tcagaaaatc aaatgatgac ctaaatttcc cttaatttgc aaatacagta gtaattaagg 1620
tacatctcta aagtggagca cttacaccag gctctaagat tcactttgag gtggaactta 1680
aaaccagtgt actgtatgta tgcattggta atagctactt tkgcttcata gcttccatac 1740
caacmaaata tatttrttna gratagtatg aaagtcangg gagg                 1784
```

<210> 170
<211> 1296
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1261)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1276)
<223> n equals a,t,g, or c

<400> 170
ggcggtgcag aggcggcagg aagatggagt tggggagttg cctggagggc gggagggagg 60
cggcggagga agagggcgag cctgaggtga aaaagcggcg acttctgtgt gtggagtttg 120
cctcggtcgc aagctgcgat gccgcagtgg ctcagtgctt cctggccgag aacgactggg 180
agatggaaag ggctctgaac tcctacttcg agcctccggt ggaggagagc gccttggaac 240
gccgacctga aaccatctct gagcccaaga cctatgttga cctaaccaat gaagaaacaa 300
ctgattccac cacttctaaa atcagcccat ctgaagatac tcagcaagaa aatggcagca 360
tgttctctct cattacctgg aatattgatg gattagatct aaacaatctg tcagagaggg 420
ctcgaggggt gtgttcctac ttagctttgt acagcccaga tgtgatattt ctacaggaag 480
ttattccccc atattatagc tacctaaaga agagatcaag taattatgag attattacag 540
gtcatgaaga aggakatttc acagctataa tgttgaagaa atcaagagtg aaattaaaaa 600
gccaagagat tattcctttt ccaagtacca aaatgatgag aaacctttta tgtgtgcatg 660
tgaaygtgtc aggaaatgag ctttgcctta tgacatccca tttggagagc accagagggc 720
atgctgcgga acgaatgaat cagttaaaaa tggttttaaa gaaaatgcaa gaggctccag 780
agtcagctac agttatattt gcaggagata caaatctaag ggatcgagag gttaccagat 840
gtggtggttt acccaacaac attgtggatg tctgggagtt tttgggyaaa cctaaacatt 900
gccagtatac atgggataca caaatgaact ctaatcttgg aataactgct gcttgtaaac 960
ttcgttttga tcgaatattt ttcagagcag cagcagaaga gggacacatt attccccgaa 1020
gtttggacct tcttggatta gaaaaactgg actgtggtag atttcctagt gatcactggg 1080
gtcttctgtg caacttagat ataatattgt aaaatgcttt tcaagtgtgg gttttgccct 1140
gattgttgca aatacaattt ccaccttctg gaaaggtagg tttgctgtgg aggaaataat 1200
gwactagatc attgtcacag aaaaaccaac tatgatttat ggkkgtgttt tcmccaryat 1260
nagacggaaa gacccncccc ttcttccccc cccccct 1296

<210> 171
<211> 1897
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (952)
<223> n equals a,t,g, or c

<400> 171

gagaaaactg acttcgagga attctttcta aggtgtcaga tgcctgatac attcaattca 60
tggtttctta taaccctact ccacgtctgg atgtgtctag tccgaatgaa gcaggaaggc 120
cggagtggga agtacatgtg tcgtatcata gttcatttta tgtgggagga tgttcagcag 180
cgcgcagagt catgggggtt aatccctata tcctgaagaa gaacatgatc ctcatgacaa 240
atcatttcta tgcagcgatc ttgggatatg atgaggggat cctttcagat gatcatgggc 300
tggccgctgc cctctggaga accttcttca accggaaatg tgaagaccct cgacatcttg 360
aattgctggt agagtatgtg aggaaacaga tacagtacct ggactccatg aacggggagg 420
atctgcttct gacaggggag gtgagctggc gccctctagt ggagaagaat cctcagagca 480
tcctgaagcc ccattctccg acttacaacg acgaggact ttgatgggct gggcctccgc 540
acggcccgcc agctggcttc gaggaacctc caggagagaa gtgcctgttg gtccaggacc 600
ctgcagaaag tggcctgaac tgacctctga acagcatctg tcaaatacct ggccccattt 660
gtgttgagtt tcctcttagt gtgcccagga gtctgatctg ctggggtaca gggctgggag 720
aacccctagc tctcccgggg tgtcctctcc cttaggggaa gccccgagtg agagtccccc 780
agcacacact ccccaacccc ctccagcaac tacatgtgac tgatagcttt tcccaaaggc 840
caaggaaggg atggtgtagg ttcaaaaggg aaacccccca gggcctgctg tggcctagga 900
gcagattgta atgctgccga gtccggtcgg tgaccacgcg ttgtccctcg gntttcagcc 960
atggggttga gttggccatt aaaagaaaca gagacttctc tctgccatgg cccttcttta 1020
ttccagggac ttagaaactt gcctgagatg gtggacgcag taatgagggc accgcgcast 1080
cagttagaga cggagaaagg gaagaggctg ggatggtctc tgctgctctt gcctctagtt 1140
catggagatg tgtctctgtt caggccaaga tacagccagc caggcctgtc gtctgggacc 1200
caggaggcct ctgatgacca agggctttca catcctaagt catttggaag gaggccttga 1260
gaacaaagtc acctttgtca ctcccagtga actgaatgag gaacatgctg tctcctgtct 1320
tggcctcccc tttcatgaga tactggggag aagagaacat tcctcctggc ttagttgtag 1380
cagacccaga cctgtgccca gctttggtcc cccttcccaa cttctgaagc acgtgctgca 1440
gagccacctt ggtctgagca cctgaggacc agcccctcct ccctcagtgc gggtcatctc 1500
ttgggggatt ttcttaaagt gaagaaaggg ggtggggaac catattgccc ctccctcccc 1560
catcaaactt ccttcattta acttgctata aaatgagtca tataaagaaa ctctatatgg 1620
gtgaggtata tcccacttct gtgaaaacat tacaaatcaa accgcttctc tcagtttatt 1680
taagatgctt ttgttgcgag cggagctcta gagtgaagcc tcctgtgtgt gtgtgagata 1740
ataacacctt gtaactcatt acagctgggc actatttaca taaaccagag ctgagccagg 1800
caggaatttg ctgattaatt tatttttaat ggagtgaagt ataccatgca ccaaaataaa 1860
ctttactgtg tgtacctaaa aaaaaaaaaa aaaaaaa 1897

<210> 172
<211> 1723
<212> DNA
<213> Homo sapiens

<400> 172
cggggagttc acctccgccc gtcacctcct ccccttgtcg cctaggtcca cccgagcccc 60
ctcccccggg ccgcccccga gcacgaagtt ggcgggagcc tataaaagct ggtgccggcg 120
cgacccgsgg acacacagtg caggcgccca agccgccgcc gccagatcgg tgccgattcc 180
tgccctgccc cgaccgccag cgcgaccatg tcccatcact gggggtacgg caaacacaac 240
ggacctgagc actggcataa ggacttcccc attgccaagg gagagcgcca gtcccctgtt 300
gacatcgaca ctcatacagc caagtatgac ccttccctga agcccctgtc tgtttcctat 360
gatcaagcaa cttccctgag gatcctcaac aatggtcatg ctttcaacgt ggagtttgat 420
gactctcagg acaaagcagt gctcaaggga ggacccctgg atggcactta cagattgatt 480
cagtttcact ttcactgggg ttcacttgat ggacaaggtt cagagcatac tgtggataaa 540
aagaaatatg ctgcagaact tcacttggtt cactggaaca ccaaatatgg ggattttggg 600
aaagctgtgc agcaacctga tggactggcc gttctaggta ttttttgaa ggttggcagc 660
gctaaaccgg gccttcagaa agttgttgat gtgctggatt ccattaaaac aaagggcaag 720

agtgctgact tcactaactt cgatcctcgt ggcctccttc ctgaatccct ggattactgg 780
acctacccag gctcactgac cacccctcct cttctggaat gtgtgacctg gattgtgctc 840
aaggaaccca tcagcgtcag cagcgagcag gtgttgaaat tccgtaaact taacttcaat 900
ggggagggtg aacccgaaga actgatggtg gacaactggc gcccagctca gccactgaag 960
aacaggcaaa tcaaagcttc cttcaaataa gatggtccca tagtctgtat ccaaataatg 1020
aatcttcggg tgtttccctt tagctaagca cagatctacc ttggtgattt ggaccctggt 1080
tgctttgtgt ctagttttct agacccttca tctcttactt gatagactta ctaataaaat 1140
gtgaagacta gaccaattgt catgcttgac acaactgctg tggctggttg gtgctttgtt 1200
tatggtagta gtttttctgt aacacagaat ataggataag aaataagaat aaagtacctt 1260
gactttgttc acagcatgta gggtgatgag cactcacaat tgttgactaa aatgctgctt 1320
ttaaaacata ggaaagtaga atggttgagt gcaaatccat agcacaagat aaattgagct 1380
agttaaggca aatcaggtaa aatagtcatg attctatgta atgtaaacca gaaaaaataa 1440
atgttcatga tttcaagatg ttatattaaa gaaaaacttt aaaaattatt atatatttat 1500
agcaaagtta tcttaaatat gaattctgtt gtaatttaat gacttttgaa ttacagagat 1560
ataaatgaag tattatctgt aaaaattgtt ataattagag ttgtgataca gagtatattt 1620
ccattcagac aatatatcat aacttaataa atattgtatt ttagatatat tctctaataa 1680
aattcagaat tctaaaaaaa aaaaaaaaaa aaaaaaaaaa aaa 1723

<210> 173
<211> 1416
<212> DNA
<213> Homo sapiens

<400> 173
ccagtagctt ggaaagtaga gatgactaat gttttagcct tttcttggag aaaaggaaga 60
actcttcttg aatattttca cagatgattg tgattgcttt aaatgacctc tgtggcaatt 120
taaattagat ggatttaatc tcagtaatgt gctggtcgca taaatgtcat gttttaatag 180
gaaaagttac ttgtaaatct ttagaccttt gttgtcactt aggctgggga gtcactaccc 240
tatttggcat cttactagtt gggggggacct tttccgtgta cagtgatggg acttttgtga 300
cctttactct cactatgcaa tagagggttt catgtagtta atctgacatg tcaaaattgg 360
gaagactgta accttttttt tttttttta agatttctct tttttgtgtc cctcaatact 420
tagcagatgt tcatttggtg gaaattctta ttacttacat gaatgagttt gaatttagtg 480
gcaaggaaga aaaaaaaaac tcaaattatt gttttaaaag aagaaaactt gcaaagtaca 540
taagtatttt ttaaaaatca atcgaacaga aaggaatgca tgctgttttt caatggctta 600
gacatgcttt ttattcactg actagtattc actttttac aacttgtatc aaaacaaatg 660
atctttgttt ttgtcacagg caaaaacagg ttgacactgg tgggttggct ttattaatta 720
atttttttc tattaggttt tctttaataa tgttaaattt ctaaattata gcatatgttt 780
tagttaattc tgaaatcagt tacttcattt gttaatttat ccctcatatc atgaatattg 840
tttttaaat kttcctatac maatttgcat cacttctttt cttacagctt ttgcagttwa 900
tatattctaa acttgaaaat gtggtatcaa tcaataatag aagtatcact ggaggattta 960
tttagctttg tatttcttaa ttttagtcct agctactaaa gtatgtaagc cttaaagttt 1020
aaaatgtttt tcttaaatta gctttataca caaacatttt catttacttt atgaaatggg 1080
aggagatagt ccactgtgct tatgtttttt tgtttaattt ctatattctg aagcagtgca 1140
gatatagggt atgctaatca agtgagcaag gtggaacatg tacaatataa ggagaagctg 1200
taaaaatcac agtataaaat tatgaagttt ggtaactgta aaatgtactg tatttatatg 1260
taactctcat tctaaaagtt gccacaaaag ctgaattgga agcttcatgt ctgcatgaaa 1320
tttcctatat ttttaatgtg tatgatgaaa ttaattttc ttgaatatta aagtctgcca 1380
attgctatga aamaaaaaaa aaaaaaaaaa actcga 1416

<210> 174
<211> 1956

<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<400> 174
nctnantaag ggaacaaagc tggngctcca ccgcggtgcc gaccgctcta gaactagtgg 60
atcccccggg ctgcaggaat tcggcacgag gatcaaccgg atttttagga tatgcaatct 120
aacaagacca caggaaggtt atctgatggt gcaacagttt cagtacctag gatgggcttc 180
tcatcgagaa gtgcctggtt ccaaaaggtc attcttgaaa ctgatacttc aggtggaaaa 240
gtggcaggag gaatgcgagg aaggggaagg ccggacgatt atccactgcc taaatggtgg 300
cgggcgaagt ggcatgttct gtgctatagg catcgttgtt gaaatggtga aacgggcaaa 360
atgttgtcga tgttttccat gcagtaaagr cactgaggga acagcaagcc aaacatggtg 420
ggaagccccg gagcaatacc gtttctgcta tgatgtagct ttggagtacc tgggaatcat 480
cttagttggg tgagactctt taaagtgcat ccatgaagra acctgtccat ctattgagcc 540
agcagctgtt gtacctgtta cacttgtgca gaaagatttt aatgtggggg gtgggagact 600
tttacatttg agaggtaaaa gtattttttt tatgaagttg tgtatcttaa taaaaaggac 660
tgaattagtt tttattacta tattaaagca tcaacatttc atgccacata aattatattt 720
aataagaacc agattgaaat gagaacgtat tggtgtttgt acagtgaaca tgccaccttt 780
tttctcatgg tttcagtaga gcagctacca catgttgcat gagttcatac tttctacgtg 840
gcatttttct ccctttctaa aatgaaagct gatgaatctt aaaaggaaga agaaaagaaa 900
agctgtgcaa attcatagta aagttcgttt tttatatgtt tccagtgtag cagatctcta 960
tataaatata taaatatata taactggctt attttctttt aatgtgcaat gatggctgga 1020
tcattttaaa aaaaaagggt tctttttaga aaataacata agccaaagac tcaagtgtaa 1080
atatgtctat atggagaaag cacattatat ttattggtta cttacattcc tttttgatg 1140
gctaaaatac taccaccaca caatcatctt ttttttcctg aagaaagctt tttctttagc 1200
taaaatcaat tgtaaacgat ttttgtagat tattttttgt atgttttagt gtaagtagaa 1260
gataaacttt ttattcataa accaggaagc aatgttcttt atagtgattc tcttgtgtac 1320
atgcttgtga attaaatttg tgtaaaatcc cttggcaatt gggtctttta atataggacc 1380
aaattaaaac attttgctga atatgtatag tttttcacaa tttcattagg taaataatgg 1440
tttggtgatc atacatgaga aatgtacaca ttaaaaggcc ttgctgacaa cttgcacaat 1500
gttgaacata gcctttaagc atcatttaaa ttttaaagga atggagtttt tcagcctgtg 1560
gcccagcact ggtcaagaaa acaagatggc aacatatatg ctttcagggt caaatttgag 1620

caaactgtaa actgtcaggg tgataaaatg tttctcttga tgtttacatg cacaagcttt 1680
gcgttctgac tataaaaagt gtgaacaaat caatgccaga ttcctgtttt gcgcattgtc 1740
atgggattct taagtgaacc tttctaaatg tggtcttgtt cacatgctcc acgtagctgt 1800
aacttcacat catcagcttg cagtttgtaa ttgactaaag cattccagtg tcctctttct 1860
agattgccag ctcatgacat ggtgcttata aagatttaat taaagtaaga atgaaataaa 1920
gtttttataa ttataaaaaa aaaaaaaaaa aaactc 1956

<210> 175
<211> 1689
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1688)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1689)
<223> n equals a,t,g, or c

<400> 175
ggctgcaggt cgacactagt ggatccaaag aattcggcas akctcttatt cctcactttc 60
cacccccgta ttttgtaatg accatgagca atgtttttac tttttgtata atggggtggg 120
gtggagtggg ggcttctgag agtcagcctg aggtctttag aggaccagct attgtagcac 180
cttggatact tgaagtttaa tgctcagttg ggtcgggtgg cagttgactt ggtggctggc 240
atgttcagca gtgcctgggg ccctgtttct gggcagcctt tgaggatttt ctatgatatt 300
gaatgacagt tttaagtggc aactcaggcc cagctcatgc cctttttgc ctggacatgt 360
gctattttta ttcacttata tatcaattac ttgtaagggt taaactttca aacaggaagt 420
atattgggac aaaagggctc ttggggatta gatatccctt taatctgtga ccattgggca 480
aaaaatttc ctgcagcaaa agtctgaggc tgttgggacc atttttgcag ctttaatcct 540
tagcctcttt tgactgtata tttgtgttta aaatgcagag ctcaactgaa tatttccttt 600
tttgttttgt tttgttttgt tttaagaagt aggttgtttt cctgaaccgt aaacttgtat 660
cattttaact tgcacaaagg aagtctgttc ttggtattgc tcttgcactt gggtttttg 720
ttattgtttt gtgtggattt tttaaagctt ttctgttcac cctcctgcca ggaaaatccc 780
agaaagctta atgatacccc aaaatgatta cacccaggga ggaaaaaaag gagcgctttc 840
tagggtcaga atcgtggaga gaatactcag aaatgaacct ctttaaagcc ttgcaggaat 900
gagtcactct tacttaatga aatgttaaag ccaattaaaa agcatgctgt gatgcccagc 960
ttccctttcc acagggtgca tgcgtctcct gctggtgaat cacatgcggc aagaggcaac 1020
tggctccaca gcctgggatg ctgccgtacc aagaggaaag aagcagcaaa atgcctttac 1080
gttgttctaa accccgacg cataaagtgt agaggaggga tggccaaggg tgggtggtag 1140
aaagtgtgtt caggctgaca ctggcaatga gtacagataa tttcactttc ctcttccagg 1200
ggcaaaggct gatggcctct acctttgtat ccaggagaaa ctgcagagca gccctgtgac 1260
tttacaaaat atgctacctc aaagtgctac cgataaacct ttctaattgt aagksccтta 1320
ctaagggcac atgtcttaat caaagttagt tttttgtttt ctggtttgtt ttttttttt 1380
tgtatattga tgaatgagat cttacctatt aaatatatta ttggattatg gttcctgaag 1440
gtcattagag tgtgtgtgtg tgtgtgtgtg tgtgtgtgtg ttttatgact taaatatctt 1500
tacgtgtgtt ttttagagct tggttcttta aagatttgga gaagatatgt aaattaccaa 1560
ggcacttggt ttttctgttt tatatactaa taatcagggc ctaagttaaa taaaaatatg 1620
tgtgcatgta ttttaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1680

aaaaaaaann 1689

<210> 176
<211> 1016
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (895)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (928)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (970)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (992)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1001)
<223> n equals a,t,g, or c

<400> 176
taagagagct ttgcaaaaaa aaaaagaaaa aagaaaaaaa aaaaaccacg tttctttgtt 60
gagctgtgtc ttgaaggcaa aagaaaaaaa atttctacag tagtctttct tgtttctagt 120
tgagctgcgt gcgtgaatgc ttattttctt ttgtttatga taatttcact taactttaaa 180
gacatatttg cacaaaacct ttgtttaaag atctgcaata ttatatatat aaatatatat 240
aagataagag aaactgtatg tgcgagggca ggagtatttt tgtattagaa gaggcctatt 300
aaaaaaaaaa gttgttttct gaactagaag aggaaaaaaa tggcaatttt tgagtgccaa 360
gtcagaaagt gtgtattacc ttgtaaagaa aaaaattaca aagcaggggt ttagagttat 420
ttatataaat gttgagattt tgcactattt tttaatataa atatgtcagt gcttgcttga 480
tggaaacttc tcttgtgtct gttgagactt taagggagaa atgtcggaat ttcagagtcg 540
cctgacggca gagggtgagc ccccgtggag tctgcagaga ggccttggcc aggagcggcg 600
ggctttcccg aggggccact gtccctgcag agtggatgct tctgcctagt gacaggttat 660
caccacgtta tatattccct accgaaggag acaccttttc ccccctgacc cagaacagcc 720
tttaaatcac aagcaaaata ggaaagttaa ccacggaggc accgagttcc aggtagtggt 780
tttgcctttc ccaaaaatga aaataaactg ttaccgaagg aattagtttt tcctcttctt 840
ttttccaact gtgaaggtcc ccgtggggtg gagcatggtg cccctcacaa gccgnacggc 900
tggtgcccgg gctaccaggg acatgccnga gggctcgatg acttgtctct gcagggcgct 960
ttggtggtgn ttaactggct aaaggttacc gntgaaggca ngtgcggtaa ctggcc 1016

<210> 177
<211> 1364
<212> DNA
<213> Homo sapiens

<400> 177
gaatcccact cccttctccc acttgttaat tagttacata ctttttgta attgtttatt 60
tggttgctgt ctccctctca agaatgcagg gaccatgtct gcattctgca gtaatcacta 120
ctgcacaccc agaatctatt acagatcctg gcatgtagct gatgcataaa tatttgttga 180
atgaaagtct gtacattgta tttatgctat tggtattgct atgacctgaa actaaaagga 240
gttgtggaaa agatttctta tggaacagaa atatcccttt tgattaatat cacaatctcg 300
taaattgaga aaacaaawaa tatatactac tggagcattc atgtatagtt ggagattatg 360
actcatttat tggtgtgttt ttggactcag aacaaagatg agggaatatt ccttaaagct 420
ctgtattgaa ataacgaaaa gcagtcacat tttaataata gaagcttcct agcttactct 480
ttctgtaatc ttcttttcct aaatgtaaga gagcctcata attatgaggc ttattactag 540
agtaaggctg tcaaaggcag caaaatgtct ttctgtttgg aagaataaca taaacttgac 600
atgtatggtg ggggacagaa ggtttcaaaa gtttaagaat ctgtgttgtc ttaacaaata 660
gatgcttctc aaggasstta cgytagtggt tactctgtcc agtcagggtt ttttcttctt 720
taacttgggt tcatttcctg atggcacaca tgaagtttgg atcatatggt ttgactttag 780
ctatggtcct tagctatggg gagcagcatc agcgacctgt gacatgtaaa ttaaaaatac 840
aatgccaggg cccttcccca gcccctctga tagagaacct cttggccatc tgtattttta 900
gatgttccag gttagtctga ttaacaccct tggttaagaa ccattgggag gatctgattg 960
ccagtttaag gggaccttca agcctgtagg tctttatagt taaaaaaaaa aaaagatttt 1020
aaaaatcatg catatgttgt ggctgaawtc tggtttagca catactgctt ttaatggcct 1080
gaaatgtttt tcccaaataa attstcttgt tatagctttc atgtgtgatt tggtccagct 1140
tcttgttttg aagatactta cggggggga cactttgtga tttctcttag taacatatta 1200
acccacttaa aaaccctttc tattacaggt cttcacattt aggcttaatg tgcttaattc 1260
aaatgtaaaa atacacctgc ctttgttctc agtgaaagta tgtaataaat aaatgagggg 1320
ttggcaaact actgcccacc atctgttttt ttatggccta tgaa 1364

<210> 178
<211> 740
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (38)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (171)
<223> n equals a,t,g, or c

<400> 178
tggctgggac tccaggcgca taccaccatg actggctnat ttttgtgttt ttagtagaga 60
cggggtttca ccatgttggc caggctggtc ttgaacttct ggccccaagt catctgcctg 120
cctcagcctc ccaaggtgct gggattacaa gtgtgagcca ctgtgtacag nctttgtgtt 180
aacttacttt gaattagccc cttattccaa agctgcctcc tgaaaggasg cttcctaaaa 240
ggtgttgctt tggggtaaat aagaggtgct ggtgaagtga gactagcttg cgcatctctc 300

tgccatgaag gaaactagct ccgcagacgt tttactaacc acagcagacc ccctccttga 360
ggaacccaga agggcagaga gcatcagatg aaatcaactg ctgagagagg gaagtgagtg 420
ctgtgttggc accgctgcca gaaactcttg agaatgagca tcgtgtgcca cttatccact 480
gcttgccgac ttcagtagca agagcctcca gaatgctcat ggataaacat catctttgtg 540
gccacacatt gttttatgag ctgagtcatc agactggctg gctccttaaa tgctgctgtg 600
tgattctcta ggcagcagaa aacaaggaga gaagatatga agtgtatctc atcgagcttt 660
gtagagggcc agtatcgatt caccaaaggt gatgggggat ttaccattat ggagtttgct 720
tgtgataaaa aattattgat 740

<210> 179
<211> 1410
<212> DNA
<213> Homo sapiens

<400> 179
gaaaatgtat ataataggca aggaaagaaa tacagtactg tttctggacc cttataaaat 60
cctgtgcaat agacacatac atgtcacatt tagctgtgct cagaagggct atcatcaycc 120
tacaactcac attagagaac atcctggctt ttgagcactt ttcaaacaat caagttgact 180
cacgtgggtc ctgaggcctg cagcacgtcg gatgctaccc cactatgaca gaggattgtg 240
gtcacaactt gatggctgcg aagacctacc ctccgttttt ctactagata ggaggatggt 300
agaagtttgg ctgctgtcat aacatccaga gcyttgtcgt atttggcaca cagcagaggc 360
ccagatatta gaaaggctct attccaataa actatgagga ctgccttatg gatgatttaa 420
gtgtctcact aaagcatgaa atgtgaattt ttattgttgt acatacgatt taaggtattt 480
aaagtatttt cttctctgtg agaaggttta ttgttaatac aaggtataat aaaattatcg 540
caacccctct ccttccagta taaccagctg aagttgcaga tgttagatat ttttcataaa 600
caagttcgag tcaaagttga aaattcatag taagattgat atctataaaa tagatataaa 660
tttttaagag aaagaattta gtattatcaa agggataaag aaaaaaatac tatttaagat 720
gtgaaaatta cagtccaaaa tactgttctt tccaggctat gtataaaata catagtgaaa 780
attgtttagt gatattacat ttatttatcc agaaaactgt gatttcagga gaacctaaca 840
tgctggtgaa tattttcaac tttttccctc actaattggt acttttaaaa acataacata 900
aattttttga agtctttaat aaataaccca taattgaagt gtataatata aaaaatttta 960
aaaatctaag cagcttattg tttctctgaa agtgtgtgta gttttacttt cctaaggaat 1020
taccaagaat atcctttaaa atttaaaagg atggcaagtt gcatcagaaa gctttatttt 1080
gagatgtaaa aagattccca aacgtggtta cattagccat tcatgtatgt cagaagtgca 1140
gaattggggc acttaatggt caccttgtaa cagttttgtg taactcccag tgatgctgta 1200
cacatatttg aagggtcttt ctcaaagaaa tattaagcat gttttgttgc tcagtgtttt 1260
tgtgaattgc ttggttgtaa ttaaattctg agcctgatat tgatatggtt ttaagaagca 1320
gttgtaccaa gtgaaattat tttggagatt ataataaata tatacattca aaaaaaaaaa 1380
aaaaaaaaaa aaaaaaaaaa aaraaaaaaa 1410

<210> 180
<211> 1493
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1328)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (1352)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1406)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1436)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1484)
<223> n equals a,t,g, or c

<400> 180
ggccaaatct tcccgggctg ctgtgggcaa caagatgttt gtcaagggtg cccctgaggg 60
cgtcatcgac cgctgtaact atgtgcgagt tggcaccacc cgggtgccac tgacggggcc 120
ggtgaaggaa aagatcatgg cggtgatcaa ggagtggggc actggccggg acaccctgcg 180
ctgcttggcc ctggccaccc gggacacccc cccgaagcga gaggaaatgg tcctggatga 240
ctctgccagg ttcctggagt atgagacgga cctgacattc gtgggtgtag tgggcatgct 300
ggaccctccg cgcaaggagg tcacgggctc catccagctg tgccgtgacg ccgggatccg 360
ggtgatcatg atcactgggg acaacaaggg cacagccatt gccatctgcc ggcgaattgg 420
catctttggg gagaacgagg aggtggccga tcgcgcctac acgggccgag agttcgacga 480
cctgcccctg gctgaacagc gggaagcctg ccgacgtgcc tgctgcttcg cccgtgtgga 540
gccctcgcac aagtccaaga ttgtggagta cctgcagtcc tacgatgaga tcacagccat 600
gacaggtgat ggcgtcaatg acgcccctgc cctgaagaag ctgagattgg cattgccatg 660
ggatctggca ctgccgtggc caagactgcc tctgagatgg tgctggctga cgacaacttc 720
tccaccatcg tarctgctgt ggaggarggc cgcgccatct acaacaacat gaagcagttc 780
atccgctacc tcatttcctc caacgtgggc gaggtggtct gtatcttcct gaccgctgcc 840
ctggggctgc ctgaggccct gatcccggtg cagctgctat gggtgaactt ggtgaccgac 900
gggctcccag ccacagccct gggcttcaac ccaccagacc tggacatcat ggaccgcccc 960
ccccggagcc ccaaggagcc cctcatcagt ggctggctct tcttccgcta catggcaatc 1020
gggggctatg tgggtgcagc caccgtggga gcagctgcct ggtggttcct gtacgctgag 1080
gatgggcctc atgtcaacta cagccagctg actcacttca tgcagtgcac cgaggacaac 1140
acccactttg agggcataka ctgtgaggtc ttcgaggccc ccgagcccat gaccatggcc 1200
ctgtccgtgc tggtgaccat cgagatgtgc aatgcactga acagcctgtc cgaraaccag 1260
tccctgctgc ggaattgcma cccctggggt traacaattc ttgggctggc tgggsttcca 1320
ttcttggnct tcttccaatg ttcccctggc ancttccctc aattccctcc taatgnttga 1380
accccccttg cccgaatgaa tctttnaagg cttccggggc ccttggaacc ttcaanccaa 1440
gttgggttaa tggttcctcc aagattttca attggccagt taantggggg ttc 1493

<210> 181
<211> 2040
<212> DNA
<213> Homo sapiens

<400> 181
gcatgagctc atgcaagagg caggggatga gtgtgagccc gagtggtgtg atgccgagga 60
cccactcttc atcctgtaca ccagtggctc cacaggcaaa cccaagggtg tggttcacac 120
agttgggggc tacatgctct atgtagccac aaccttcaag tatgtgtttg acttccatgc 180
agaggatgtg ttctggtgca cggcagacat tggttggatc actggtcatt cctacgtcac 240
ctatgggcca ctggccaatg gtgccaccag tgttttgttt gaggggattc ccacatatcc 300
ggacgtgaac cgcctgtgga gcattgtgga caaatacaag gtgaccaagt tctacacagc 360
acccacagcc atccgtctgc tcatgaagtt tggagatgag cctgtcacca agcatagccg 420
ggcatccttg caggtgttag gcacagtggg tgaacccatc aaccctgagg cctggctatg 480
gtaccaccgg gtggtaggtg cccagcgctg ccccatcgtg gacaccttct ggcaaacaga 540
gacaggtggc cacatgttga ctccccttcc tggtgccaca cccatgaaac ccggttctgc 600
tactttccca ttctttggtg tagctcctgc aatcctgaat gagtccgggg aagagttgga 660
aggtgaagct gaaggttatc tggtgttcaa gcagccctgg ccagggatca tgcgcacagt 720
ctatgggaac cacgaacgct ttgagacaac ctactttaag aagtttcctg gatactatgt 780
tacaggagat ggctgccagc gggaccagga tggctattac tggatcactg gcaggattga 840
tgacatgctc aatgtatctg gacacctgct gagtacagca gaggtggagt cagcacttgt 900
ggaacatgag gctgttgcag aggcagctgt ggtgggccac cctcatcctg tgaagggtga 960
atgcctctac tgctttgtca ccttgtgtga tggccacacc ttcagcccca agctcaccga 1020
ggagctcaag aagcagatta gagaaaagat tggccccatt gccacaccag actacatcca 1080
gaatgcacct ggcttgccta aaacccgctc agggaaaatc atgaggcgag tgcttcggaa 1140
gattgctcag aatgaccatg acctcgggga catgtctact gtggctgacc catctgtcat 1200
cagtcacctc ttcagccacc gctgcctgac catccagtga acatgatcct gacctttacc 1260
taggattcct cctgctccaa actttgccca tcctctttgc cccctcagga gtgctgaggg 1320
ccagtgttga cccacactac cctcccttga ccagctgtct gggaccggaa accagctttg 1380
tctccaggta gagacaacat cctgtgactg ccaggcagaa aggacagggc ccaggtcagc 1440
ctcagtctgc tgtgcctcca gactgcagag ctctcagaac ccagaacaga gacgaaaagg 1500
ctacctctcc tacccaagtt aagtgttcaa aggggatgtg agggcctcca ctgaagcagg 1560
gaggcagctg tgtaatccta tgtcagctct cttaggaagc cccagtactt atattgggca 1620
tgcacttgcc cttaaaaaca atgatttgtg agtccaggaa caatttacta tttttaaaat 1680
attttgctgc ttctgttctg ggtctgaatt ccccttttgtg ccagatgcca gtactgtctg 1740
cccattggct ccaggggctg tatgggcaga ttcagtctcc agagggtatt cagatcatct 1800
gcttctttga aggagtaaat gtgttttgtt cctagggcca gaggagcttg tcttccttgt 1860
cctctgttcc caccctcccc tgaacagaac ccagcccata agagacattc tcagatgaaa 1920
ctctgttttc ttgccccagt caggctcaag ccctgtggtt gtaggaataa agcctgtgat 1980
ctcaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaactcgaa 2040

<210> 182
<211> 969
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (128)
<223> n equals a,t,g, or c

<400> 182
agacagttct nattctcccc agggcaggga gcaggttatg accaggacta aggtcccaaa 60
gtccccaccc tgaacccctc cctgctgttc caccgctccc tcatatccac ccctgcccca 120
tctcctgnac tttggtcacg ctagcatctt ctgctgatcc tgaaattgta ccagcggcaa 180
gatgtggcct ggaaggggac tttaagttct ccacaactgc cagcaatcct tccaccaggc 240
aaaacacatc atctaaggaa aagaagtgag gtttgcttag ggcgtggcag cttcggataa 300
acgcaggact ccgcctggca gcccgatttc tcccggaacc tctgctcagc ctggtgaacc 360
acacaggcca gcgctctgac atgcagaagg tgaccctggg cctgcttgtg ttcctggcag 420
gctttcctgt cctggacgcc aatgacctag aagataaaaa cagtcctttc tactatgact 480
ggcacagcct ccaggttggc gggctcatct gcgctggggt tctgtgcgcc atgggcatca 540
tcatcgtcat gagtgagtgg aggagctcgg gggagcaggc gggccggggc tggggctccc 600
ctcccctgac cactcagctc tccccaacag gtgcaaaatg caaatgcaag tttggccaga 660
agtccggtca ccatccaggg gagactccac ctctcatcac cccaggctca gcccaaagct 720
gatgaggaca gaccagctga aattgggtgg aggaccgttc tctgtcccca ggtcctgtct 780
ctgcacagaa acttgaactc caggatggaa ttcttcctcc tctgctggga ctcctttgca 840
tggcagggcc tcatctcacc tctcgcaaga gggtctcttt gttcaatttt ttttwatcta 900
aaatgattgt gcctctgccc aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 960
aaaaaaaga 969

<210> 183
<211> 1452
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (18)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1430)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1441)
<223> n equals a,t,g, or c

<400> 183
gtcgacccac gcgtccnncc acggtccggt ggggagaagc cgggaggact gggtgcgcct 60

gcagggatcg gaagccggtt ggggtgtgag aggttttctc gctctaggga gattcttcaa 120
gcaatcacta tgtcaacaga cacaggtgtt tcccttcctt catatgagga agatcaggga 180
tcaaaactca ttcgaaaagc taaagaggca ccattcgtac ccgttggaat agcgggtttt 240
gcagcaattg ttgcatatgg attatataaa ctgaagagca ggggaaatac taaaatgtcc 300
attcatctga tccacatgcg tgtggcagcc caaggctttg ttgtaggagc aatgactgtt 360
ggtatgggct attccatgta tcgggaattc tgggcaaaac ctaagcctta gaagaagaga 420
tgctgtcttg gtcttgttgg aggagcttgc tttagttaga tgtcttatta ttaaagttac 480
ctattattgt tggaaataaa ctaatttgta tgggtttaga tggtaacatg gcattttgaa 540
tattggcttc ctttcttgca ggcttgattt gcttggtgac cgaattacta gtgactagtt 600
tactaactag gtcattcaag gaagtcaagt taacttaaac atgtcaccta aatgcacttg 660
atggtgttga aatgtccacc ttcttaaatt tttaagatga acttagttct aaagaagata 720
acaggccaat cctgaaggta ctccctgttt gctgcagaat gtcagatatt ttggatgttg 780
cataagagtc ctatttgccc cagttaattc aactttgtc tgcctgtttt gtggactggc 840
tggctctgtt agaactctgt ccaaaaagtg catggaatat aacttgtaaa gcttcccaca 900
attgacaata tatatgcatg tgtttaaacc aaatccagaa agcttaaaca atagagctgc 960
ataatagtat ttattaaaga atcacaactg taaacatgag aataacttaa ggattctagt 1020
ttagtttttt gtaattgcaa attatatttt tgctgctgat atattagaat aatttttaaa 1080
tgtcatcttg aaatagaaat atgtatttta agcactcacg caaaggtaaa tgaacacgtt 1140
ttaaatgtgt gtgttgctaa ttttttccat aagaattgta aacattgaac tgaacaaatt 1200
acctataatg gatttggtta atgacttatg agcaagctgg tttggccaga cagtataccc 1260
aaacttttat ataatataca gaaggctatc acacttgtga aattctcttg tctaatctga 1320
atttgcattc catggtgtta acatggtata tgtattgtta ttaaagtaag tgacccatgt 1380
caaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaan aaaaaaaaaa 1440
naaaaaaaaa aa 1452

<210> 184
<211> 2119
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2090)
<223> n equals a,t,g, or c

<400> 184
aaattgaaac ttctaataaa aatgatatga ctatagatat attacatgct gatggtgaaa 60
gacctaatgt tctagaaaac ctagacaact caaaggaaaa gactgttgga tcagaagcag 120
caaaaactga agatacagtt ctctgcagca gtgatacaga tgaggagtgt ttaatcattk 180
wtacagaatg taaaaataat agtgatggaa agacagctgt tgtgggttct aacttaagtt 240
ccagaccagc tagtccaaat tcttcctcag gacaggcttc tgtaggaaac cagactaata 300
ctgcttgtwg tcctgaagag tcatgtgttt taaaaaaacc tatcaaacga gtatataaaa 360
aatttgatcc agttggagag attttaaaaa tgcaggatga gctcttwaag ccaatttcca 420
gaaaagtacc agaattgccc ttaatgaatt tagaaaattc taaacagcct tctgtttctg 480
agcaattgtc tggtccttca gactcctcta gttggccgaa atctggatgg ccttctgcat 540
ttcagaagcc aaaaggacga ttgccatatg aacttcagga ctatgttgaa gatacatcgg 600
aatacctagc tcctcaggaa ggaaattttg tttataagtt atttagcctg caagacctgt 660
tgttactcgt acgctgcagt gtccagagga tagagacaag accacgttct aaaaaacgga 720
agawwatyag aagacaattt ccagtttatg tactaccaaa agtagagtat caagcttgtt 780
atggagttga agctctgact gaaagtgaac tttgtcgctt atggactgaa agtttattgc 840
attccaacag ctcattttat gttgggcata tcgatgcatt tacttcaaaa ctttttctac 900

```
tggaagaaat tacctcagaa gaattaaaag aaaagctttc agcactcaag atttccaatt 960
tatttaacat cctccaacac attctaaaga aactaagtag cttgcaggag ggttcctact 1020
tgttatctca tgcagcagaa gattcttcac tcctgattta taaggcctct gatggaaaag 1080
ttactaggac agcatacaat ttgtataaaa cacattgcgg ccttcctggt gtaccttcca 1140
gtctctcagt tccctgggtc ccattagatc ccagcctgtt attaccatat catatccatc 1200
atggaagaat accttgtact tttccaccga aatcactgga taccacaaca caacaaaaga 1260
ttggtggaac gagaatgcct acacgcagcc acaggaatcc agtttccatg gaaaccaaaa 1320
gcagttgctt gcctgctcag caagttgaaa ctgaaggagt ggctccacat aaaagaaaaa 1380
taacttgagg actgtaccat ggaaaactaa atttaaaaaa mcagttataa cagtgtttaa 1440
tttagataag tttgagggaa aataatcagt aggcaagagg aacatttttc ctgtagtagc 1500
tagagtgcct tgaaaaaatg tgttggctat gtgaaggaat atttcaacta aaatggaatg 1560
gtatgctttt caccccttraa gtttgaggag gatcttgata tgttttaaca ttatcatggc 1620
agggaaatat ataaagaaga aaaatatttt tacattaaac cttttctaaa aattgtaaat 1680
agaaaaataa tttggttttt tatcaagaac aacacttatc gttatgtatt gtgttagtta 1740
tattgccagt ctgttgcgac tgactcaaaa agttaaatgt tgccactgct gaagatgatt 1800
atgagcatcg caaactttgt ttctgaccca ttttgacagt ttttatatac tcctttaaaa 1860
tgatgaatgt tacaggttaa taaagttaat acctttaaaa acttggtgaa attccattac 1920
agaagccaaa aataaaaact ccctgcctct gaaaagtcag attactgact tcttgtttgg 1980
caaccatcag tttgtttaat aaaagaaaaa atttggtggt ataacatgtt tgatgacaga 2040
tgcctctatc tctagattca agctgagtgt tgaaatacac tgctgaaagn aagagatagg 2100
tatgttttcc agaaaaaaa                                               2119
```

<210> 185
<211> 1325
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1319)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1320)
<223> n equals a,t,g, or c

<400> 185

```
atgactgggg agcgacccag ncacggcgct cccgggacag acgctggggg ccscggaatc 60
tctccctgga tattggcact gaagtgtttg cccctggacc gggctctggt attcagaaac 120
agcgggagcc acggaagggc cgcctcatcg tgtgtggcca tgggacgctg gagcgggacg 180
gagtcttctg tctcctcagc gatgatcatg gtgcctcctg gcgctacgga agtggggtca 240
gcggcatccc ctacggtcag cccaagcagg aaaatgattt caatcctgat gaatgccagc 300
cctatgagct cccagatggc tcagtcgtca tcaatgcccg aaaccagaac aactaccact 360
gccactgccg aattgtcctc cgcagctatg atgcctgtga tacactaagg ccccgtgatg 420
tgaccttcga ccctgagctc gtggaccctg tggtagctgc aggagctgta gtcaccagct 480
```

ccggcattgt cttcttctcc aacccagcac atccagagtt ccgagtgaac ctgaccctgc 540
gatggagctt cagcaatggt acctcatggc ggaaagagac agtccagcta tggccaggcc 600
ccagtggcta ttcatccctg gcaaccctgg agggcagcat ggatggagag gagcaggccc 660
cccagctcta cgtcctgtat gagaaaggcc ggaaccacta cacagagagc atctccgtgg 720
ccaaaatcag tgtctatggg acactctgag ctgtgccact gccacagggg tattctgcct 780
tcaggactct gccttcagga acacggtctt gtagagggtc tgctggagac gcctgaaaga 840
cagttccatc ttcctttaga ctccagcctt ggcaaaatca ccttcccttt accagggaaa 900
tcacttcctt taggactgaa agctaggcgt cctctcccac aaaaaagtcc tgccctcatc 960
tgagaatact gtctttccat atggctaagt gtggccccac caccctctct gcctcccggg 1020
acattgattg gtcctgtctt gggcaggtct agtgagctgt agaattgaat caatgtgaac 1080
tcagggaact ggggaaggct gagcctcctc tttggtgttg cggtaagata accgacaggg 1140
ctggtgaaag tccccagatg gcaggatatt tggtttcaga gtaaggacta ggtgcaccac 1200
catgactgac tatcaatcaa aatgtttgta acttaaaatt tttaatgaag gataatgaat 1260
attaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaann 1320
aaaaa 1325

<210> 186
<211> 433
<212> DNA
<213> Homo sapiens

<400> 186
aattcggcac gagggcgcag gccccagcca gctcaggcta cactatccca ggatcagcat 60
ggccgtccgc cagtgggtaa tcgccctggc cttggctgcc ctccttgttg tggacaggga 120
agtgccagtg gcagcaggaa agctcccttt ctcaagaatg cccatctgtg aacacatggt 180
agagtctcca acctgttccc agatgtccaa cctggtctgc ggcactgatg ggctcacata 240
tacgaatgaa tgccagctct gcttggcccg gataaaaacc aaacaggaca tccagatcat 300
gaaagatggc aaatgctgat cccacaggag cacctcaagc catgaagtgt cagctggaga 360
acagtggtgg gcatggagag gatatgacat gaaataaaag atccagccca aaaaaaaaaa 420
aaaaaaaaaa aaa 433

<210> 187
<211> 859
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (803)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (853)
<223> n equals a,t,g, or c

<400> 187
cccacgcgtc cgcccacgcg tccgcccacg cgtccgaccg gggcttttcg tgagctcgtc 60
tctgatctcg cgcaagagtg acacacaggt gttcaaagac gcttctgggg agtgagggaa 120
gcggtttacg agtgacttgg ctggagcctc aggggcgggc actggcacgg aacacacccct 180
gaggccagcc ctggctgccc aggcggagct gcctcttctc ccgcgggttg gtggacccgc 240

tcagtacgga gttggggaag ctctttcact tcggaggatt gctcaacaac catgctgggc 300
atctggaccc tcctacctct ggttcttacg tctgttrcta gattatcgtc caaaagtgtt 360
aatgcccaag tgactgacat caactccaag ggattggaat tgaggaagac tgttactaca 420
gttgagactc agaacttgga aggcctgcat catgatggcc aattctgcca taagccctgt 480
cctccaggtg aaaggaaagc tagggactgc acagtcaatg gggatgaacc agactgcgtg 540
ccctgccaag aagggaagga gtacacagac aaagcccatt tttcttccaa atgcagaaga 600
tgtagattgt gtgatgaagg acatggctta kaagtggaaa taaactgcac ccggacccag 660
aatmccaagt gcagatgtaa accaaacttt ttttgkaact ctactgtatg tgaacactgt 720
gacccttgca ccaaatgtga acatggaatc atcaaggaat gcacactcac cagcaacacc 780
aagtgcaaag aggaaggatc canatctaac ttggggtggc tttggcttct tcttttgcca 840
attccctaat tgnttgggt 859

<210> 188
<211> 833
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (65)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (798)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (803)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (809)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (812)
<223> n equals a,t,g, or c

<400> 188
tcgcagagat tacaccactg caacgagact cgggcccaga cgagatctgc ctgggcgaca 60
cagtnagact ctgtctcaaa ataaataaat aagtaaatag aacctcctga gctaccctgg 120
cttataagga ttcagattac tttaggaaat taggcattag cactaggagg ggggaagatg 180
gctggcaaaa cttctagcta gcaacctatg tctagcacat gggtaactaa ccatagcgag 240
atcctgaaca catatcctct aggtgcaggt ggagggaacg atgtccaata cctgaagcag 300
aatctcacat ggacggaacg tctgtatttc cctctcctgc acgaatcact catcattctt 360
ggagggcttc tctgcattcc tccttttctt ctctcccctc ccctgccttt tgtcttttct 420
aaagagtctg aactccgatt tccatgctct cctgctacat taataagcaa aacctgcttg 480

tgtgtacggt tctttactgg aaacatgact ttttgtttct gtattggttt tactgtcatc 540
cagttttcta gtttaatatc tagcaaaact aaatctgaat gtactcgctt tttccgttaa 600
gtatgccaag cacctcggtt gaaaggcttg actcaaacca gaagtcttgc tggaattcgt 660
ctctgaacac ttgaaaaaca gaaaccctga gccgcaacaa acatgcctct gtgtgtcggg 720
attgcctttg tctctgcttc catgtggctt ttcctttttgt agctatgctt agtgacataa 780
tcttccctct tcaagcantc tgngttggnc cnttcccgtt ccccccccg tgc 833

<210> 189
<211> 2211
<212> DNA
<213> Homo sapiens

<400> 189
ggcacgagga gtacagggcc cgcgcatgcg tggattgtcg tcttctgtcc aagttggtcg 60
cttccctgcg ccaaagtgag cagtagccaa catgtcaggg tgggagtcat attacaaaac 120
cgagggcgat gaagaagcag aggaagaaca agaagagaac cttgaagcaa gtggagacta 180
taaatattca ggaagagata gtttgatttt tttggttgat gcctccaagg ctatgtttga 240
atctcagagt gaagatgagt tgacaccttt tgacatgagc atccagtgta tccaaagtgt 300
gtacatcagt aagatcataa gcagtgatcg agatctcttg gctgtggtgt tctatggtac 360
cgagaaagac aaaaattcag tgaattttaa aaatatttac gtcttacagg agctggataa 420
tccaggtgca aaacgaattc tagagcttga ccagtttaag ggcagcaggg gacaaaaacg 480
tttccaagac atgatgggcc acggatctga ctactcactc agtgaagtgc tgtgggtctg 540
tgccaacctc tttagtgatg tccaattcaa gatgagtcat aagaggatca tgctgttcac 600
caatgaagac aacccccatg gcaatgacag tgccaaagcc agccgggcca ggaccaaagc 660
cggtgatctc cgagatacag gcatcttcct tgacttgatg cacctgaaga aacctggggg 720
ctttgacata tccttgttct acagagatat catcagcata gcagaggatg aggacctcag 780
ggttcacttt gaggaatcca gcaagctaga agacctgttg cggaaggttc gcgccaagga 840
gaccaggaag cgagcactca gcaggttaaa gctgaagctc aacaaagata tagtgatctc 900
tgtgggcatt tataatctgg tccagaaggc tctcaagcct cctccaataa agctctatcg 960
ggaaacaaat gaaccagtga aaaccaagac ccggaccttt aatacaagta caggcggttt 1020
gcttctgcct agcgatacca agaggtctca gatctatggg agtcgtcaga ttatactgga 1080
gaaagaggaa acagaagagc taaaacggtt tgatgatcca ggtttgatgc tcatgggttt 1140
caagccgttg gtactgctga agaaacacca ttacctgagg ccctccctgt tcgtgtaccc 1200
agaggagtcg ctggtgattg ggagctcaac cctgttcagt gctctgctca tcaagtgtct 1260
ggagaaggag gttgcagcat tgtgcagata cacaccccgc aggaacatcc ctccttattt 1320
tgtggctttg gtgccacagg aagaagagtt ggatgaccag aaaattcagg tgactcctcc 1380
aggcttccag ctggtctttt taccctttgc tgatgataaa aggaagatgc cctttactga 1440
aaaaatcatg gcaactccag agcaggtggg caagatgaag gctatcgttg agaagcttcg 1500
cttcacatac agaagtgaca gctttgagaa ccccgtgctg cagcagcact tcaggaacct 1560
ggaggccttg gccttggatt tgatggagcc ggaacaagca gtggacctga cattgcccaa 1620
ggttgaagca atgaataaaa gactgggctc cttggtggat gagtttaagg agcttgttta 1680
cccaccagat tacaatcctg aagggaaagt taccaagaga aaacacgata atgaaggttc 1740
tggaagcaaa aggcccaagg tggagtattc agaagaggag ctgaagaccc acatcagcaa 1800
gggtacgctg ggcaagttca ctgtgcccat gctgaaagag gcctgccggg cttacgggct 1860
gaagagtggg ctgaagaagc aggagctgct ggaagccctc accaagcact tccaggactg 1920
accagaggcc gcgcgtccag ctgcccttcc gcagtgtggc caggctgcct ggccttgtcc 1980
tcagccagtt aaaatgtgtt tctcctgagc taggaagagt ctacccgaca taagtcgagg 2040
gactttatgt ttttgaggct ttctgttgcc atggtgatgg tgtagccctc ccactttgct 2100
gttccttact ttactgcctg aataaagagc cctaagtttg tactataaaa aaaaaaaaaa 2160
aaaaaaaaaa aaagtcgacc ggccgttaat ttagtagtag taggcggccg c 2211

<210> 190
<211> 1659
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1582)
<223> n equals a,t,g, or c

<400> 190
atcgggttca agaagaaaat gctaggctta agaagaaaaa agagcagttg cagcaggaaa 60
tcgaagactg gagtaaatta catgctgagc tcagtgagca aatcaaatca tttgagaagt 120
ctcagaaaga tttggaagta gctcttactc acaaggatga taatattaat gctttgacta 180
actgcattac acagttgaat ctgttagagt gtgaatctga atctgagggt caaaataaag 240
gtggaaatga ttcagatgaa ttagcaaatg gagaagtggg aggtgaccgg aatgagaaga 300
tgaaaaatca aattaagcag atgatggatg tctctcggac acagactgca atatcggtag 360
ttgaagagga tctaaagctt ttacagctta agctaagagc ctccgtgtcc actaaatgta 420
acctggaaga ccaggtaaag aaattggaag atgaccgcaa ctcactacaa gctgccaaag 480
ctggactgga agatgaatgc aaaaccttga ggcagaaagt ggagattctg aatgagctct 540
atcagcagaa ggagatggct ttgcaaaaga aactgagtca agaagagtat gaacggcaag 600
aaagagagca caggctgtca gctgcagatg aaaaggcagt ttcggctgca gaggaagtaa 660
aaacttacaa gcggagaatt gaagaaatgg aggatgaatt acagaagaca gagcggtcat 720
ttaaaaacca gatcgctacc catgagaaga aagctcatga aaactggctc aaagctcgtg 780
ctgcagaaag agctatagct gaagagaaaa gggaagctgc caatttraga cacaaattat 840
tagawttaac acaaaagatg gcaatgctgc aagaagaacc tgtgattgta aaaccaatgc 900
caggaaaacc aaatacacaa aaccctccac ggagaggtcc tctgagccag aatgtctttt 960
ggcccatccc ctgtgagtgg tggagaatgc tcccctccat tgacagtgga gccacccgtg 1020
agacctctct ctgctactct caatcgaaga gatatgccta gaagtgaatt tggatcagtg 1080
gacgggcctc tacctcatcc tcgatggtca gctgaggcat ctgggaaacc ctctccttct 1140
gatccaggat ctggtacagc taccatgatg aacagcagct caagaggctc ttcccctacc 1200
agggtactcg atgaaggcaa ggttaatatg gctccaaaag ggcccctcc tttcccagga 1260
gtccctctca tgagcacccc catgggaggc cctgtaccac cacccattcg atatggacca 1320
ccacctcagc tctgcggacc ttttgggcct cggcacttcc tccacccttt ggccctggta 1380
tgcgtccacc actaggctta agagaatttg caccaggcgt tccaccagga agacgggacc 1440
tgcctctcca ccctcgggga tttttacctg gacacgcacc atttagacct ttaggttcac 1500
ttggcccaag agagtacttt attcctggta cccgattacc accccaacc catggtcccc 1560
aggaataccc accamcacct gnttgttaar gagratttat kgcgttcagt gttagagatg 1620
aggcctcaac tggcttctta gaggcattag ccagggatt 1659

<210> 191
<211> 3894
<212> DNA
<213> Homo sapiens

<400> 191
cacacttgaa gctgaaaaag aaagaagaaa atctgggcta tcctcaagag ttcagtttcg 60
aaaccaaggt tctgagccca aatatactca agaactaact ctgaagaggc agaaacagaa 120
agtgtgcatg gaggaaaccc tgtggctaca ggataatatc agagataaac tgcgtcccat 180
tcccataact gcctcagtgg agatccaaga gccaagctct cgtaggcgag tgaattcact 240
tccagaagtt cttccaattc tgaattcaga tgaacccaag acagctcata ttgatgttca 300

cttcttaaaa gagggatgtg gagacgacaa tgtatgtaac agcaacctta aactagaata 360
taaattttgc acccgagaag gaaatcaaga caaatttwct tatttaccaa ttcaaaaagg 420
tgtaccagaa ctagttctaa aagatcagaa ggatattgct ttagaaataa cagtgacaaa 480
cagcccttcc aacccaagga atcccacaaa agatggcgat gaygcccatg aggctaaact 540
gattgcaacg tttccagaca ctttaaccta ttctgcatat agagaactga gggctttccc 600
tgagaaacag ttgagttgtg ttgccaacca gaatggctcg caagctgact gtgagctcgg 660
aaatcctttt aaaagaaatt caaatgtcac tttttatttg gttttaagta caactgaagt 720
cacctttgac accccagatc tggatattaa tctgaagtta gaaacaacaa gcaatcaaga 780
taatttggct ccaattacag ctaaagcaaa agtggttatt gaactgcttt tatcggtctc 840
gggagttgct aaaccttccc aggtgtattt tggaggtaca gttgttggcg agcaagctat 900
gaaatctgaa gatgaagtgg gaagtttaat agagtatgaa ttcagggtaa taaacttagg 960
taaacctctt acaaacctcg gcacagcaac cttgaacatt cagtggccaa aagaaattag 1020
caatgggaaa tggttgcttt atttggtgaa agtagaatcc aaaggattgg aaaaggtaac 1080
ttgtgagcca caaaaggaga taaactccct gaacctaacg gagkctcaca actcaagaaa 1140
gaaacgggaa attactgaaa aacagataga tgataacaga aaattttctt tatttgctga 1200
aagaaaatac cagactctta actgtagcgt gaacgtgaac tgtgtgaaca tcagatgccc 1260
sctgcggggg ctggacagca aggcgtctct tattttgcgc tcgaggttat ggmacagcac 1320
atttctagag gaatattcca aactgaacta cttggacatt ctcatgcgag ccttcattga 1380
tgtgactgct gctgccgaaa atatcaggct gccaaatgca ggcactcagg ttcgagtgac 1440
tgtgtttccc tcaaagactg tagctcagta ttcgggagta ccttggtgga tcatcctagt 1500
ggctattctc gctgggatct tgatgcttgc tttattagtg tttatactat ggaagtgtgg 1560
tttcttcaag agaaataaga aagatcatta tgatgccaca tatcacaagg ctgagatyca 1620
tgctcagcca tctgataaag agaggsttac ttcygatgca tagtattgat ctacttctgt 1680
aattgtgtgg attcyttaaa cgctctaggt acgatgacag tgttccccga taccatgctg 1740
taaggatccg gaaagaagag cgagagatca aagatgaaaa gtatattgat aaccttgaaa 1800
aaaaacagtg gatcacaaag tggaacgaaa atgaaagcta ctcatagcgg gggcctaaaa 1860
aaaaaaagct tcacagtacc caaactgctt tttccaactc agaaattcaa tttggattta 1920
aaagcctgct caatccctga ggactgattt cagagtgact acacacagta cgaacctaca 1980
gttttaactg tggatattgt tacgtagcct aaggctcctg ttttgcacag ccaaatttaa 2040
aactgttgga atggattttt ctttaactgc cgtaatttaa ctttctgggt tgcctttrtt 2100
tttggcgtgg ctgacttaca tcatgtgttg gggaagggcc tgcccagttg cactcaggtg 2160
acatcctcca gatagtgtag ctgaggaggc acctacactc acctgcacta acagagtggc 2220
cgtcctaacc tcgggcctgc tgcgcagacg tccatcacgt tagctgtccc acatcacaag 2280
actatgccat tggggtagtt gtgtttcaac ggaaagtgct gtcttaaact aaatgtgcaa 2340
tagaaggtga tgttgccatc ctaccgtctt ttcctgtttc ctagctgtgt gaatacctgc 2400
tcacgtcaaa tgcatacaag tttcattctc cctttcacta aaacacacag gtgcaacaga 2460
cttgaatgct agttatactt atttgtatat ggtatttatt ttttcttttc tttacaaacc 2520
atttgttat tgactaacag gccaaagagt ctccagttta cccttcaggt tggtttaatc 2580
aatcagaatt agagcatggg aggtcatcac tttgacctaa attatttact gcaaaaagaa 2640
aatctttata aatgtaccag agagagttgt tttaataact tatctataaa ctataacctc 2700
tccttcatga cagcctccac cccacaaccc aaaaggttta agaaatagaa ttataactgt 2760
aaagatgttt atttcaggca ttggatattt tttactttag aagcctgcat aatgtttctg 2820
gatttcatac tgtaacattc aggaattctt ggagaaaatg ggtttattca ctgaactcta 2880
gtgcggttta ctcactgctg caaatactgt atattcagga cttgaaagaa atggtgaatg 2940
cctatggtgg atccaaactg atccagtata agactactga atctgctacc aaaacagtta 3000
atcagtgagt cgatgttcta ttttttgttt tgtttcctcc cctatctgta ttcccaaaaa 3060
ttactttggg gctaatttaa caagaacttt aaattgtgtt ttaattgtaa aaatggcagg 3120
gggtggaatt attactctat acattcaaca gagactgaat agatatgaaa gctgattttt 3180
tttaattacc atgcttcaca atgttaagtt atatggggag caacagcaaa caggtgctaa 3240
tttgttttgg atatagtata agcagtgtct gtgttttgaa agaatagaac acagtttgta 3300
gtgccactgt tgttttgggg gggctttttt cttttcggaa atcttaaacc ttaagatact 3360

aaggacgttg ttttggttgt actttggaat tcttagtcac aaaatatatt ttgtttacaa 3420
aaatttctgt aaaacaggtt ataacagtgt ttaaagtctc agtttcttgc ttggggaact 3480
tgtgtcccta atgtgtttag attgctagat tgctaaggag ctgatacttt gacagtgttt 3540
ttagacctgt gttactaaaa aaaagatgaa tgtcctgaaa agggtgttgg gagggtggtt 3600
caacaaagaa acaaagatgt tatggtgttt agatttatgg ttgttaaaaa tgtcatctca 3660
agtcaagtca ctggtctgtt tgcatttgat acatttttgt actaactagc attgtaaaat 3720
tatttcatga ttagaaatta cctgtggata tttgtataaa agtgtgaaat aaatttttta 3780
taaaagtgtt cattgtttcg taacacagca ttgtatatgt gaagcaaact ctaaaattat 3840
aaatgacaac ctgaattatc tatttcatca aaaaaaaaaa aaaaaaaaaa aaaa 3894

<210> 192
<211> 695
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (23)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (28)
<223> n equals a,t,g, or c

<400> 192
annctataca ncatacaggg aanggtanac tgacagtacg gtcggattcc cgggtcgacc 60
cacgcgtccg ctgagccatt agaaaatcca tttaaaaaga tgaaaaacaa cattgttgat 120
gctgcaaaca atcacagtgc cccagaagta ctgtatgggt ccttgcttaa ccaggaagag 180
ctgaaattta gcagaaatga tcttgaattt aaatatcctg ctggtcatgg ctcagccagc 240
graagtgaac acaggagttg ggccagagag agcaaaagct ttaatgttct gaaacagctg 300
cttctctcag aaaactgtgt gcgagatttg tccccgcaca gaagtaactc tgtggctgac 360
agtaaaaaga aaggacacaa aaataatgtg accaacagca aacctgaatt tagcatttct 420
tctttaaatg gactgatgta cagttccact cagcccagca gttgcatgga taacaggaca 480
ttttcatacc caggtgtagt aaaaactcct gtgagtccta ctttccctga gcacttgggc 540
tgtgcagggt ctagaccaga atctgggctt ttgaatgggt gttccatgcc cagtgagaaa 600

ggacccatta agtgggttat cactgatgcg gagaagatga gtatgaaaag cctctccaga 660
ttgaccaaac caccccatac twtattacat gcttc 695

<210> 193
<211> 3131
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3128)
<223> n equals a,t,g, or c

<400> 193
gggnncaaan gctggagctc caccgnggtg cgtccgctct agaactagtg gatcccccgg 60
gctgcaggat tcggcacgag gccacttcct ggggccgccg gcggggccgc tggctgcact 120
cagcgccgga gccgggagct agcggccgcc gccatgtccc accagaccgg catccaagca 180
agtgaagatg ttaaagagat ctttgccaga gccagaaatg gaaagtacag acttctgaaa 240
atatctattg aaaatgagca acttgtgatt ggatcatata gtcagccttc agattcctgg 300
gataaggatt atgattcctt tgttttaccc ctgttggagg acaaacaacc atgctatata 360
ttattcaggt tagattctca gaatgcccag ggatatgaat ggatattcat tgcatggtct 420
ccagatcatt ctcatgttcg tcaaaaaatg ttgtatgcag caacaagagc aactctgaag 480
aaggaatttg gaggtggcca cattaaagat gaagtatttg gaacagtaaa ggaagatgta 540
tcattacatg gatataaaaa atacttgctg tcacaatctt cccctgcccc actgactgca 600
gctgaggaag aactacgaca gattaaaatc aatgaggtac agactgacgt gggtgtggac 660
actaagcatc aaacactaca aggagtagca tttcccattt ctcgagaarc ctttcaggct 720
ttggaaaaat tgaataatag acagctcaac tatgtgcagt tggaaataga tataaaaaat 780
gaaattataa ttttggccaa cacaacaaat acagaactga aagatttgcc aaagaggatt 840
cccaaggatt cagctcgtta ccatttcttt ctgtataaac attcccatga aggagactat 900
ttagagtcca tagtttttat ttattcaatg cctggataca catgcagtat aagagagcgg 960
atgctgtatt ctagctgcaa gagccgtctg ctagaaattg tagaaagaca actacaaatg 1020

gatgtaatta gaaagatcga gatagacaat ggggatgagt tgactgcaga cttcctttat 1080
gaagaagtac atcccaagca gcatgcacac aagcaaagtt ttgcaaaacc aaaaggtcct 1140
gcaggaaaaa gaggaattcg aagactaatt aggggcccag cggaaactga agctactact 1200
gattaaagtc atcacattaa acattgtaat actagttttt taaaagtcca gcttttagta 1260
caggagaact gaaatcattc catgttgata taaagtaggg aaaaaaattg tacttttttgg 1320
aaaatagcac ttttcacttc tgtgtgtttt taaaattaat gttatagaag actcatgatt 1380
tctattttttg agttaaagct agaaaagggt tcaacataat gtttaatttt gtcacactgt 1440
tttcatagcg ttgattccac acttcaaata cttcttaaaa ttttatacag ttgggccagt 1500
tctagaaagt ctgatgtctc aaagggtaaa cttactactt tcttgtggga cagaaagacc 1560
ttaaaatatt catattactt aatgaatatg ttaaggacca ggctagagta ttttctaagc 1620
tggaaactta gtgtgccttg gaaaaggccg caagttgctt actccgagta gctgtgctag 1680
ctctgtcaga ctgtaggatc atgtctgcaa cttttagaaa tagtgcttta tattgcagca 1740
gtcttttata tttgactttt ttttaatagc attaaaattg cagatcagct cactctgaaa 1800
ctttaagggt accagatatt ttctatactg caggatttct gatgacattg aaagacttta 1860
aacagcctta gtaaattatc tttctaatgc tctgtgaggc caaacattta tgttcagatt 1920
gaaatttaaa ttaatatcat tcaaaaggaa acaaaaaatg ttgagtttta aaaatcagga 1980
ttgacttttt tctccaaaac catacattta tgggcaaatt gtgttcttta tcacttccga 2040
gcaaatactc agatttaaaa ttactttaaa gtcctggtac ttaacaggct aacgtagata 2100
aacaccttaa taatctcagt taatactgta tttcaaaaca catttaactg ttttctaatg 2160
ctttgcatta tcagttacaa cctagagaga ttttgagcct catatttctt tgatacttga 2220
aatagaggga gctagaacac ttaatgttta atctgttaaa cctgctgcaa gagccataac 2280
tttgaggcat tttctaaatg aactgtgggg atccaggatt tgtaatttct tgatctaaac 2340
tttatgctgc ataaatcact tatcggaaat gcacatttca tagtgtgaag cactcatttc 2400
taaaccttat tatctaaggt aatatatgca cctttcagaa atttgtgttc gagtaagtaa 2460
agcatattag aataattgtg ggttgacaga tttttaaaat agaatttaga gtatttgggg 2520
ttttgtttgt ttacaaataa tcagactata atatttaaac atgcaaaata actgacaata 2580
atgttgcact tgtttactaa agatataagt tgttccatgg gtgtacacgt agacagacac 2640
acatacaccc aaattattgc attaagaatc ctggagcaga ccatagctga agctgttatt 2700
ttcagtcagg aagactacct gtcatgaagg tataaaataa tttagaagtg aatgttttttc 2760
tgtaccatct atgtgcaatt atactctaaa ttccactaca ctacattaaa gtaaatggac 2820
attccagaat atagatgtga ttatagtctt aaactaatta ttattaaacc aatgattgct 2880
gaaaatcagt gatgcatttg ttatagagta taactcatcg tttacagtat gttttagttg 2940
gcagtatcat acctagatgg tgaataacat attcccagta aatttatata gcagtgaaga 3000
attacatgcc ttctggtgga cattttataa gtgcatttta tatcacaata aaaatttttt 3060
ctctttaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 3120
aaaaaaaanaa a 3131

<210> 194
<211> 2058
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2045)
<223> n equals a,t,g, or c

<400> 194
gccactccgg gtttatttgt ttacaagcgg attacgtcag ctcctccctc tcttccctat 60
ctctggaccc gcctcctgaa ctcttttccc gccccttcg gctccgaacc ggcttgcgtc 120
acaatggtgc gatattcgga ttggctggag tcggccatca cgctccacgt acgccacttc 180

```
cttttcgtgg cactataaag ggtgctgcac ggcgcttgca tctcttcgcc tctcggagct 240
ggaaatgcag ctattgagrt cttcgaatgc tgcggagctg gaggcggagg cagctgggga 300
ggtccgagcg atgtgaccag gccgccatcg ctcgtctctt cctctctcct gccgcctcct 360
gtctcgaaaa taactttttt agtctaaaga aagaaagaca aaagtagtcg tccgcccctc 420
acgccctctc ttcctctcag ccttccgccc ggtgaggaag cccggggtgg ytgctccgcc 480
gtcggggccg cgccgccgag ccccggccgc cccgggccgc ccccgcacgc cgccccccatg 540
catcccttct acacccgggc cgccaccatg ataggcgaga tcgccgccgc cgtgtccttc 600
atctccaagt ttctccgcac caaggggctc acgagcgagc gacagctgca gaccttcagc 660
cagagcctgc aggagctgct ggcagaacat tataaacatc actggttccc agaaaagcca 720
tgcaagggat cgggttaccg ttgtattcgc atcaaccata aaatggatcc tctgattgga 780
caggcagcac agcggattgg actgagcagt caggagctgt tcaggcttct cccaagtgaa 840
ctcacactct gggttgaccc ctatgaagtg tcctacagaa ttggagagga tggctccatc 900
tgtgtgctgt atgaagcctc accagcagga ggtagcactc aaaacagcac caacgtgcaa 960
atggtagaca gccgaatcag ctgtaaggag gaacttctct tgggcagaac gagcccttcc 1020
aaaaactaca atatgatgac tgtatcaggt taagatatag tctgtggatg gatcatctga 1080
tgatgatgga taaatttgat ttttgctttg ggtgggctcc tcttggggat ggattatgga 1140
atttaaacca tgtcacagct gtgaagatct ggcacaagat agaatggtaa aaaaaaaaaa 1200
aaattttaag tgacagtgcc atagtttgga cagtaccttt caatgattaa ttttaatagc 1260
ctgtgagtcc aagtaaatga tcactttatt tgctagggag ggaagtccta gggtggtttc 1320
agtttctccc agacatacct aaatttttac atcaatcctt ttaaagaaaa tctgtatttc 1380
aaagaatctt tctctgcagt aaatctcgca ggggaatttg cactattaca cttgaaagtt 1440
gttattgtta accttttcgg cagcttttaa taggaaagtt aaacgtttta aacatggtag 1500
tactggaaat tttacaagac ttttacctag cacttaaata tgtataaatg tacataaaga 1560
caaactagta agcatgacct ggggaaatgg tcagaccttg tattgtgttt ttggccttga 1620
aagtagcaag tgaccagaat ctgccatggc aacaggcttt aaaaaagacc cttaaaaaga 1680
cactgtctca actgtggtgt tagcaccagc cagctctctg tacatttgct agcttgtagt 1740
tttctaagac tgagtaaact tcttattttt agaaagtgga ggtctggttt gtaactttcc 1800
ttgtacttaa ttgggtaaaa gtcttttcca caaaccacca tctattttgt gaactttgtt 1860
agtcatcttt tatttggtaa attatgaact ggtgtaaatt tgtacagttc atgtatattg 1920
attgtggcaa agttgtacag atttctatat tttggatgag aaatttttct tctctctata 1980
ataaatcgtt tcttatcttg gcattttaaa aaaaaaaaaa aaaaaaaaaa gggcgggcgc 2040
tctanaagat ccaagctt                                               2058
```

<210> 195
<211> 831
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (44)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (791)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (793)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (806)
<223> n equals a,t,g, or c

<400> 195
anccctcact aagggaacaa aagctggnag ctccaccgcg gtgncgaccg ctctagaact 60
agtggatccc ccgggctgca ggaattcggc agagttcgac ctctgctgca gcccgtgccg 120
ccgccgcctc ctgggaagag aggaagcggg agaggagccc acgtcgcctg tcacccaata 180
tctccagccg cgcagtcccg aagagtgtaa gatgttcgcc tgcgccaagc tcgcctgcac 240
cccctctctg atccgagctg gatccagagt tgcatacaga ccaatttctg catcagtgtt 300
atctcgacca gaggctagta ggactggaga gggctctacg gtatttaatg gggcccagaa 360
tggtgtgtct cagctaatcc aaagggagtt tcagaccagt gcaatcagca gagacattga 420
tactgctgcc aaatttattg gtgcaggtgc tgcaacagta ggagtggctg gttctggtgc 480
tggtattgga acagtctttg gcagccttat cattggttat gccagaaacc cttcgctgaa 540
gcagcagctg ttctcatatg ctatcctggg atttgccttg tctgaagcta tgggtctctt 600
ttgtttgatg gttgctttct tgattttgtt tgccatgtaa caaattactg cttgacatgt 660
tggcattcat attaattacg gatgtaattc tgtgtatctt actgtgactc cgaaaactgt 720
agtattggtg tcatgggaat gtacgttatt tccaaagtca tttcattaaa gatgaaaact 780
ttaattcctc ngngattgga ctacanaagt tagattaccc caagagacgg c 831

<210> 196
<211> 961
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (32)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (923)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (947)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (953)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (954)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (960)
<223> n equals a,t,g, or c

<400> 196
tagatagaac agatgttttg tgtgaaattt nntatcttta acttaatwaa ccagcaggaa 60
ctgtatgaac acaacacacc caactgacaa acagagagaa ctaacatgtt tatttagctg 120
tatgtatata tgcttaacta cacccgagga agctgtagag ttagaaaaac atgaaccatt 180
aacagatgtg gcctccctgc agaactttta ctttgaaaaa gaagtacgtc tgaaccagat 240
tcacatgttt gatatttgga tgcagagaaa atggggcaga aagcatcgca acagttggct 300
ctgaaggaca gcaaagaggt gcccgtcgtc tgtgargtgg tcagtgaagc tatagtccat 360
gcagctcaga aactgaagga gtaccttgga tttgaatatc ctccaagtaa actctgccca 420
gctgcaaata ctctgaatga gatcttctta atccatttca tcactttctg ccaagaaaag 480
ggagttgatg agtggctgac caccaccaag atgaccaagc accaagcctt cctgtttggt 540
gcagactgga tttggacctt ttggggatcy gacaagcaaa taaagcttca gctcgcagta 600
cagactctgc agatgtcttc acctcctcct gtggaatcta agccttgtga cctttccaat 660
ccagaatcaa rggtaragga rtcttcctgg aagaaaagta gatttgataa gctggaagaa 720
ttctgtaact taataggaga ggattgcctg ggtctgttta tcatctttgg tatgccagga 780
aagcctaaag acatcagggg agttgtcctg gacagtgtca aaagtcagat ggtgaggagc 840
catctgccag gagggaaggc tgtggctcas tttgtcctgg aaactgaaga ttgtgtgttc 900
atcaaagagc tgctcaaaat tgnctgagta agaaagacgg gctgganaga agnnggcaan 960
g 961

<210> 197
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (488)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (500)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (603)
<223> n equals a,t,g, or c

<400> 197
gcttgggtct gtcccgggtg gacgacgccg tggctgccaa cacccgccag tgygcccaga 60
ggagggacag gagaggcggt gaaggaagag ggcaggggat cgagccttca cccgcctctg 120
ccaccccagg gactcgggga gtatgccgca tgccagtcac acgccttcat gaagggcgtt 180
ttcaccttcg tcacaggcac cggcatggcc tttggcttgc agatgttcat tcagaggaag 240
tttccatacc ctttgcagtg gagcctccta gtggccgtgg ttgcaggctc tgtggtcagc 300
tacggggtga cgagagtgga gtcggagaaa tgcaacaacc tctggctctt cctggagacc 360
gggcagctcc ccaaagacag gagcacagat cagagaagct aggagagctc cagcaggggc 420
acagaggatt gggggcagga ggagtctgga acacagcctt catgcccccct gaccccaggc 480
cgaccctncc cacaccctan ggtaccccag tcgtatcctc tgtccgcatg tgtggccagg 540
cctgacaaac acctgcagat ggctgctgcc caacctggga ccttgcccag gaggttggag 600
canaaa 606

<210> 198
<211> 393
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (354)
<223> n equals a,t,g, or c

<400> 198
cccacgcgtc cgcccacgcg tcctggacct cctgtgcaag aacatgaaac acctgtggtt 60
cttcctcctg ctggtggcag ctcccagatg ggtcctgtcc caggtgcagc tgcaggagtc 120
gggcccagga ctggtgaagc cttcacagac cctgtccctc acctgcactg tctctggtgg 180
ctccatcagc agtggtgctt actactggag ctggatccgc cagcacccag ggaagggcct 240
ggagtggatt ggntwcatct attacagtgg gascacctac tacaayccgt ccctcaarag 300
tctagttasc atatcastag acacgtctaa gaaccasttc tccctgaasc tganctctgt 360
gackgccgcg gacacggmcg tgtattactg tgc 393

<210> 199
<211> 1061
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1035)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1056)
<223> n equals a,t,g, or c

<400> 199
gccccacgct gaccaccggc gtggagggaa ggcctctgag actctgcact gagcaccatt 60
ttggacttgt gtgtccagga gtcatgtccc ccgacgagta ccaytcaggg gtcaacaact 120
ctgtgtacac caacgtcctg gtccagaaca ggtcagacac aagatcccct cacctcaccc 180
caccccgcc ccagctggag acctgccccg gtgcccccac taggcaggca gcagctggaa 240
gtgtaggggt tgcagcctcc cccamctacc tccacctcca gcctgcgctt tgctgctgcc 300
ctggcccagg acctgggtct tcccatcccc agccaktggc tggcggtggc tgacaagatc 360
aaggtaccct ttgacgtkga gcagaacttc cacccggagt tcgatgggta tgagcctggt 420
gaktggaccc cttcaagggy tcctcccctg ccgtcgagac cctcgagtct gtcctggaac 480
accttccagt cagcggcacc tccctgtagg agaggtggtg aagcaggcag acgtcgtgct 540
cctgggatac cmagtcccct tctccctgag tcctgatgtt cgcaggaaaa atctggagat 600
ttacgaggct gtgacgtccc cccagggccc cgccatgacc tggagcatgt ttgctgtggg 660
ctggatggag ctgaaggacg cagtgcgggc ccggggcctc ctggacagga gctttgccaa 720
catggctgaa cccttcaagg tgtggacgga gaatgcagac gggtcaggcg ctgtgaactt 780
cctgacaggc atggggggct tctgcaggcg gtggtcttcg ggtgcacggg gttcagggtc 840
acccgagcgg gtgtgacctt tgaccctgtg tgtctgtcgg ggatctccag artgagcgty 900
tccggcatct tctaccaggg gaacaagctc aacttctctt tttccgagga ctccgtgacc 960
gtggaggtca cagctcgagc agggccctgg gctcctcacc tggaggctga gctgtggcca 1020
ttccagtccc ggmtnttcct tgtkcmggam macaangggc t 1061

<210> 200
<211> 1359
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1005)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1128)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1342)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1343)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1344)
<223> n equals a,t,g, or c

<400> 200
tcacgcgtcc ggggctgcag taggtcccgg caaccgcagg ctcgcggcgg gcgctgggcg 60
cgggatccga ctctagtcgt aatggaggcg ggcggctttc tggactcgct catttacgga 120
gcatgcgtgg tcttcaccct tggcatgttc tccgccggcc tctcggacct caggcacatg 180
cgaatgaccc ggagtgtgga caacgtccag ttcctgccct ttctcaccac ggaagtcaac 240
aacctgggct ggctgagtta tggggctttg aagggagacg ggatcctcat cgtcgtcaac 300
acagtgggtg ctgcgcttca gaccctgtat atcttggcat atctgcatta ctgccctcgg 360
aagcgtgttg tgctcctaca gactgcaacc ctgctagggg tccttctcct gggttatggc 420
tacttttggc tcctggtacc caaccctgag gcccggcttc agcagttggg cctcttctgc 480
agtgtcttca ccatcagcat gtacctctca ccactggctg acttggctaa ggtgattcaa 540
actaaatcaa cccaatgtct ctcctaccca ctcaccattg ctacccttct cacctctgcc 600
tcctggtgcc tctatgggtt tcgactcaga gatccctata tcatggtgtc caactttcca 660
ggaatcgtca ccagctttat ccgcttctgg cttttctgga agtaccccca ggagcaagac 720
aggaactact ggctcctgca aacctgaggc tgctcatctg accactgggc accttagtgc 780
caacctgaac caaagagacc tccttgtttc agctgggcct gctgtccagc ttcccaggtg 840
cagtgggttg tgggaacaag agatgacttt gaggataaaa ggaccaaaga aaaagcttta 900
cttagatgat tgattggggc ctaggagatg aaatcacttt ttattttta gagattttt 960
tttttaattt tggaggttgg ggtgcaatct ttagaatatg ccttnaaagg ccgggcgcgg 1020
tgctcacgcc tgtaatccca gcactttggg aggccaaggt gggcggatcg cctgaggtca 1080
ggagttcaag accaacctga ctaacatggt gaaaccccat ctctactnaa aatacaaaat 1140
tagccaggca tgatggcaca tgcctgtaat cccagatact tgggaggctg aggcaggaga 1200
attgcttgaa cccaggaggt ggaggttgca gtgagctgag atcgtgccat tgtgatatga 1260
atatgcctta tatgctgata tgaatatgcc ttaaaataaa gtgttcccca cccctgaaaa 1320
aaaaaaaaaa aaaaaaaaaa annnaaaaag ggcggccgc 1359

<210> 201
<211> 726
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (30)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (179)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (724)
<223> n equals a,t,g, or c

<400> 201
ttcgaantta cccttcatta aagggaacan aagttggagc ttccaccgcg gtggcggccg 60
ctctagaact agtggatccc ccgggctgca ggaattcggc acgaggagag aactagtctc 120
gcgcagagcg cagcgmacgg ccacagacag ccctgggcat ccaccgacgg cgcacggang 180
ccagcagagc cggaaggcgc gccccgggca gagaaagccg agcagagctg ggtggcgtct 240
ccgggccgcc gctccgacgg gccagcgccc tccccatgtc cctgctccca cgccgcgccc 300
ctccggtcag catgaggctc ctggcggccg cgctgctcct gctgctgctg gcgctgtaca 360
ccgcgcgtgt ggacgggtcc aaatgcaagt gctcccggaa ggacccaaga tccgctacag 420
cgacgtgaag aagctggaaa tgaagccaaa gtacccgcac tgcgaggaga agatggttat 480
catcaccacc aagagcgtgt ccaggtaccg aggtcaggag cactgcctgc accccaagct 540
gcagagcacc aagcgcttca tcaagtggta caacgcctgg aacgagaagc gcagggtcta 600
cgaagaatag ggtgaaaaac ctcagaaggg aaaactccaa accagttggg agacttgtgc 660
aaaggacttt gcagattaaa aaaaaaaaaa aaaaaaaaaa aaaagccttt ctttctcaca 720
ggcnta 726

<210> 202
<211> 2714
<212> DNA
<213> Homo sapiens

<400> 202
gctttgtttg ccatttccta caggtgaaac gccatcatta ggattcactg taacgttagt 60
gctattaaac tcactagcat ttttattaat ggccgttatc tacactaagc tatactgcaa 120
cttggaaaaa gaggacctct cagaaaactc acaatctagc atgattaagc atgtcgcttg 180
gctaatcttc accaattgca tctttttctg ccctgtggcg ttttttttcat ttgcaccatt 240
gatcactgca atctctatca gccccgaaat aatgaagtct gttactctga tattttttcc 300
attgcctgct tgcctgaatc cagtcctgta tgttttcttc aacccaaagt ttaaagaaga 360
ctggaagtta ctgaagcgac gtgttaccaa gaaaagtgga tcagtttcag tttccatcag 420
tagccaaggt ggttgtctgg aacaggattt ctactacgac tgtggcatgt actcacattt 480
gcagggcaac ctgactgttt gcgactgctg cgaatcgttt cttttaacaa agccagtatc 540
atgcaaacac ttgataaaat cacacagctg tcctgcattg gcagtggctt cttgccaaag 600
acctgagggc tactggtccg actgtggcac acagtssgcc cactctgatt atgcagatga 660
agaagattcc tttgtctcag acagttctga ccaggtgcag gcctgtggac gagcctgctt 720
ctaccagagt agaggattcc ctttggtgcg ctatgcttac aatctaccaa gagttaaaga 780
ctgaactact gtgtgtgtaa ccgtttcccc cgtcaaccaa aatcagtgtt tatagagtga 840
accctattct catctttcat ctgggaagca cttctgtaat cactgcctgg tgtcacttag 900
aagaaggaga ggtggcagtt tatttctcaa accagtcatt ttcaaagaac aggtgcctaa 960
attataaatt ggtgaaaaat gcaatgtcca agcaatgtat gatctgtttg aaacaaatat 1020
atgacttgaa aaggatctta ggtgtagtag agcaatataa tgttagtttt ttctgatcca 1080
taagaagcaa atttatacct atttgtgtat taagcacaag ataaagaaca gctgttaata 1140
ttttttaaaa atctatttta aaatgtgatt ttctataact gaagaaaata tcttgctaat 1200
tttacctaat gtttcatcct taatctcagg acaacttact gcagggccaa aaaagggact 1260

gtcccagcta gaactgtgag agtatacata ggcattactt tattatgttt tcacttgcca 1320
tccttgacat aagagaacta taaattttgt ttaagcaatt tataaatcta aaacctgaag 1380
atgtttttaa aacaatatta acagctgtta ggttaaaaaa atagctggac atttgttttc 1440
agtcattata cattgctttg gtccaatcag taattttttc ttaagtgttt tgtgattaca 1500
ctactagaaa aaaagtaaaa ggctaattgc tgtgtgggtt tagtcgattt ggctaaacta 1560
ctaactaatg tgggggttta atagtatctg agggatttgg tggcttcatg taatgttctc 1620
attaatgaat acttcctaat atcgttggct ctactaatat tttccaattt gctgggatgt 1680
cacctagcaa tagcttggat tatatagaaa gtaaactgtg gtcaatactt gcatttaatt 1740
agacgaaacg gggagtaatt atgacacgaa gtacttatgt ttatttctta gtgagctgga 1800
ttatcttgaa cctgtgctat taaatggaaa tttccataca tcttccccat actatttttt 1860
ataaaagagc ctattcaata gctcagaggt tgaactctgg ttaaacaaga taatatgtta 1920
ttaataaaaa tagaagaaga aagaataaag cttagtcctg tgtctttaaa aattaaaaat 1980
tttacttgat tcccatctat gggctttaga cctattactg ggtggagtct taaagttata 2040
attgttcaat atgtttttttg aacagtgtgc taaatcaata gcaaacccac tgccatatta 2100
gttattctga atatactaaa aaaatccagc tagattgcag tttaataatt aaactgtaca 2160
tactgtgcat ataatgaatt tttatcttat gtaaattatt tttagaacac aagttgggaa 2220
atgtggcttc tgttcatttc gtttaattaa agctacctcc taaactatag tggctgccag 2280
tagcagactg ttaaattgtg gtttatatac tttttgcatt gtaaatagtc tttgttgtac 2340
attgtcagtg taataaaaac agaatctttg tatatcaaaa tcatgtagtt tgtataaaat 2400
gtgggaagga tttatttaca gtgtgttgta attttgtaag gccaactatt tacaagtttt 2460
aaaaattgct atcatgtata tttacacatc tgataaatat taaatcataa cttggtaaga 2520
aactcctaat taaaaggttt tttccaaaat tcaggttatt gaaaaytttt cattttattc 2580
atttaaaaac tagaataaca gatatataaa agtgttaatc tttgtgctat atggtatgaa 2640
atacaatatt gtactcagtg ttttgaatta ttaaagtttc tagaaagcaa aaaaaaaaaa 2700
aaaaaaactc gtag 2714

<210> 203
<211> 422
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (419)
<223> n equals a,t,g, or c

<400> 203
gacggagccg gaagcaggaa gcagcctgtk ctccccagga cctgcctggt tgggggaatt 60
ggaggcttct aggaggtggc acggtgcacg ccaagatggc tgtgtccaca gaggagctgg 120
aggccacggt tcaggaagtc ctggggagac tgaagagcca ccagtttttc cagtccacat 180
gggacactgt tgccttcatt gttttcctca ccttcatggg caccgtgctg ctcctgctgc 240
tgctggtcgt cgcccactgc tgctgctgca gctcccccgg gccccgcagg gaaagcccca 300
ggaaggaaag acccaaggga gtggataact tggccctgga accctgaccc tgtgtctcct 360
gcccggtggc agtaacaaag ccttctgtct gcccagaaaa aaaaaaaaaa aaaaaaaang 420
gg 422

<210> 204
<211> 2339
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (18)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (91)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (125)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (199)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2238)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2321)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2329)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (2334)
<223> n equals a,t,g, or c

<400> 204
anacatggcc aatcaatnnt ctttcagcgt caagaatacg ggacatncac caggaccctg 60
tgaactgacc gctgtgcctg cccttcaagt ncaaggccaa ggattgcact gtgcccatca 120
acacntgcat ccagaacccc tgtcagcatg aggcacctgc cacctgagtg acagccccaa 180
ggatgggttc agctgytcnt gccctctggg ctttragggg cagcggtgtg agatcaaccc 240
agatgactgt gaggacaacg actgcgaaam caatgccacc tgcgtggacg ggatcaacaa 300
ctacgtgtgt atctgtccgc ctaactacac aggtgagcta tgcgacgagg tgattgacca 360
ctgtgtgcct gagctgaacc tctgtcagca tgaggccaag tgcatccccc tggacaaagg 420
attcagctgc gagtgtgtcc ctggctacag cgggaagctc tgtgagacag acaatgatga 480
ctgtgtggcc cacaagtgcc gccacggggc ccagtgcgtg gacacaatca atggctacac 540
atgcacctgc ccccagggct tcagtggacc cttctgtgaa caccccccac ccatggtcct 600
actgcagacc agcccatgcg accagtacga gtgccagaac ggggcccagt gcatcgtggt 660
gcagcaggag cccacctgcc gctgcccacc aggcttcgcc ggccccagat gcgagaagct 720
catcactgtc aacttcgtgg gcaaagactc mtacgtggaa ctggcctccg ccaaggtccg 780
accccaggcc aacatctccc tgyaggtggc cctgacaagg acaacggmat ccttctctac 840
aaaggagaca atgacccccct ggcactggag ctgtaccagg gccacgtgcg gctggtctat 900
gacagcctga gttcccctcc aaccacagtg tacagtgtgg agacagtgaa tratgggcag 960
tttcacagtg tggagctggt gacgctaaac cagaccctga acctagtagt ggacaaagga 1020
actccaaaga gcctggggaa gctccagaag cagccagcag tgggcatcaa cagccccctc 1080
taccttggag gcatccccac ctccaccggc ctctccgcct tgcgccaggg cacggaccgg 1140
cctctaggcg gcttccacgg atgcatccat gaggtgcgca tcaacaacga gctgcaggac 1200
ttcaaggccc tcccaccaca gtccctgggg gtgtcaccag gctgcaagtc ctgcaccgtg 1260
tgcaagcacg gcctgtgccg ctccgtggag aaggacagcg tggtgtgcga gtgccgccca 1320
ggctggaccg gcccactctg cgatcaggag gcccgggacc cctgcctcgg ccacagatgc 1380
caccatggaa aatgtgtggc aactgggacc tcatacatgt gcaagtgtgc cgagggctat 1440
ggaggggact tgtgtgacaa caagaatgac tctgccaatg cctgctcagc cttcaagtgt 1500
caccatgggc agtgccacat ctcagaccaa ggggagccct actgcctgtg ccagcccggc 1560
tttagcggcg agcactgcca acaagagaat ccgtgcctgg gacaagtagt ccgagaggtg 1620
atccgccgcc agaaaggtta tgcatcatgt gccacagcct ccaaggtgcc catcatggaa 1680
tgtcgtgggg gctgtgggcc ccagtgctgc cagcccaccc gcagcaagcg gcggaaatac 1740
gtcttccagt gcacggacgg ctcctcgttt gtagaagagg tggagagaca cttagagtgc 1800
ggctgcctcg cgtgttccta agcccctgcc cgcctgcctg ccacctctcg gactccagct 1860
tgatggagtt gggacagcca tgtgggaccc cctggtgatt cagcatgaag gaaatgaagc 1920
tggagaggaa ggtaaagaag aagagaatat taagtatatt gtaaaataaa caaaaaatag 1980
aacttatttt tattatggaa agtgactatt ttcatctttt attatataaa tatattacac 2040
catctgcgta tatgtaccat atagtgagtt atttttacca agttttgtgt tgtgtatttg 2100
ttgtgttttt aaaaatagct gtttaaaaat ttaagaaaaa aatagactaa taaaaatgct 2160
ttaaaacaaa aggataagaa taaagaatga tagcctgtct gaggaaggag gaagatgttt 2220
tcatgtttat gaaacggnat tatgtcggca gtagaccaag agctgctcat gagatcagaa 2280
aaaggaataa gaggaagaga gaggagggaa aagaccttgt ntctgtttnt taantccct 2339

<210> 205
<211> 1655
<212> DNA
<213> Homo sapiens

<220>

<221> misc feature
<222> (1548)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1559)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1564)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1623)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1643)
<223> n equals a,t,g, or c

<400> 205
ttcggggcta gcgtcggcga ggcttgagct tgcagcgcgc ggcttccctg ctttctcgcg 60
gccaccccgg ctccggcggc ctcggcgcgc gaggggctgg aggtgcggga gccgctctcc 120
gccggtcggt ccccgcgcgg ctgagcccag gccgccagcg ccgcggccmc gtgcggtgtc 180
cctgagctcc tgctccccgc cgggctgctc cgagcaacgg tgcttcggag ctccaaactc 240
gggctgccgg ggcaagtgtc ttcatgaacc cagaggatgt ccgggaagca ctacaagggt 300
cctgaagtca gttgttgcat caaatacttc atatttggct tcaatgtcat attttggttt 360
ttgggaataa catttcttgg aattggactg tgggcatgga atgaaaaagg agttctgtcc 420
aacatctctt ccatcaccga tctcggcggc tttgacccag tttggctctt ccttgtggtg 480
ggaggagtga tgttcatttt gggatttgca gggtgcattg gagcgctacg ggaaaacact 540
ttccttctca agtttttttc tgtgttcctg ggaattattt tcttcctgga gctcactgcc 600
ggagttctag catttgtttt caaagactgg atcaaagacc agctgtattt ctttataaac 660
aacaacatca gagcatatcg ggatgacatt gatttgcaaa acctcataga cttcacccag 720
gaatattggc agtgctgtgg ggcttttgga gctgatgatt ggaacctaaa tatttacttc 780
aattgcacag attccaatgc aagtcgagag cgatgtggcg ttccattctc ctgctgcact 840
aaagatcccg cagaagatgt catcaacact cagtgtggct atgatgccag gcaaaaacca 900
gaagttgacc agcagattgt aatctacacg aaaggctgtg tgccccagtt tgagaagtgg 960
ttgcaggaca atttaaccat cgttgctggt attttcatag gcattgcatt gctgcagata 1020
tttgggatat gcctggccca gaatttggtt agcgatatcg aagctgtcag ggcgagctgg 1080
tagacccccct gcaaccgctg ctgcaagaca ctggacagac ccagctttcg ggaccctccc 1140
gcgtgccgaa ctgatcttcg agctgcatgg acctaatcac agatgcagcc tgcagtctcg 1200
cctaatggag ctgccattag ggagtgtaa aactgggaaa tgctgctcac tgacagaatt 1260
aaaaaaaaaa ataaccagta tgaaagtcgt tgcgccgtga atctctactg tagccatgaa 1320
tttatggaca gttagatgct taccaaaaaa gaaaaaaagg gagggtaggg gacccagatg 1380
tacttgaatg tgcagaaaat acattcttgt cctcatcttc cgtaattgga gggctgggag 1440
argcagcttt gctcttcacc acaccttgga cggaccacct tctttctgtt ccatggcctg 1500
aaggagtggc atctcctcaa aggactcagc ccctcacctg ggagggancg agtttctgnc 1560

cccncttaga tttttaatcc agcttggtgg tccacccgtt tgttctgccc cccctgggg 1620
agncaagatt atcaagcctt gcncgcactt cttgt 1655

<210> 206
<211> 5145
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (5126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (5143)
<223> n equals a,t,g, or c

<400> 206
gtcngattcg cggccgnatc ggaggtttcg gctaagttgg aggtactggc cacgactgca 60
tgcccgcgcc cgccaggtga tacctccgcc ggtgacccag gggctctgcg acacaaggag 120
tctgcatgtc taagtgctag acatgctcag ctttgtggat acgcggactt tgttgctgct 180
tgcagtaacc ttatgcctag caacatgcca atctttacaa gaggaaactg taagaaaggg 240
cccagccgga gatagaggac cacgtggaga aaggggtcca ccaggccccc caggcagaga 300
tggtgaagat ggtcccacag gccctcctgg tccacctggt cctcctggcc cccctggtct 360
cggtgggaac tttgctgctc agtatgatgg aaaaggagtt ggacttggcc ctggaccaat 420
gggcttaatg ggacctagag gcccacctgg tgcagctgga gccccaggcc ctcaaggttt 480
ccaaggacct gctggtgagc ctggtgaacc tggtcaaact ggtcctgcag gtgctcgtgg 540
tccagctggc cctcctggca aggctggtga agatggtcac cctggaaaac ccggacgacc 600
tggtgagaga ggagttgttg gaccacaggg tgctcgtggt ttccctggaa ctcctggact 660
tcctggcttc aaaggcatta ggggacacaa tggtctggat ggattgaagg gacagcccgg 720
tgctcctggt gtgaagggtg aacctggtgc ccctggtgaa aatggaactc caggtcaaac 780
aggagcccgt gggcttcctg gtgagagagg acgtgttggt gcccctggcc cagctggtgc 840
ccgtggcagt gatggaagtg tgggtcccgt gggtcctgct ggtcccattg ggtctgctgg 900
ccctccaggc ttcccaggtg cccctggccc caagggtgaa attggarctg ttggtaacgc 960
tggtcctgct ggtcccgccg gtccccgtgg tgaagtgggt cttccaggcc tctccggccc 1020
cgttggacct cctggtaatc ctggagcaaa cggccttact ggtgccaagg gtgctgctgg 1080
ccttcccggc gttgctgggg ctcccggcct ccctggaccc cgcggtattc ctggccctgt 1140
tggtgctgcc ggtgctactg gtgccagagg acttgttggt gagcctggtc cagctggctc 1200
caaaggagag agcggtaaca agggtgagcc cggctctgct gggccccaag gtcctcctgg 1260
tcccagtggt gaagaaggaa agagaggccc taatggggaa gctggatctg ccggccctcc 1320

aggacctcct gggctgagag gtagtcctgg ttctcgtggt cttcctggag ctgatggcag 1380
agctggcgtc atgggccctc ctggtagtcg tggtgcaagt ggccctgctg gagtccgagg 1440
acctaatgga gatgctggtc gccctgggga gcctggtctc atgggaccca gaggtcttcc 1500
tggttcccct ggaaatatcg gccccgctgg aaaagaaggt cctgtcggcc tccctggcat 1560
cgacggcagg cctggcccaa ttggcccmgc tggagcaaga ggagagcctg gcaacattgg 1620
attccctgga cccaaaggcc ccactggtga tcctggcaaa aacggtgata aaggtcatgc 1680
tggtcttgct ggtgctcggg gtgctccagg tcctgatgga aacaatggtg ctcagggacc 1740
tcctggacca cagggtgttc aaggtggaaa aggtgaacag ggtcccgctg gtcctccagg 1800
cttccagggt ctgcctggcc cctcaggtcc cgctggtgaa gttggcaaac caggagaaag 1860
gggtctccat ggtgagtttg gtctccctgg tcctgctggt ccaagagggg aacgcggtcc 1920
cccaggtgag agtggtgctg ccggtcctac tggtcctatt ggaagccgag gtccttctgg 1980
acccccaggg cctgatggaa acaagggtga acctggtgtg gttggtgctg tgggcactgc 2040
tggtccatct ggtcctagtg gactcccagg agagaggggt gctgctggca tacctggagg 2100
caagggagaa aagggtgaac ctggtctcag aggtgaaatt ggtaaccctg gcagagatgg 2160
tgctcgtggt gctcctggtg ctgtaggtgc ccctggtcct gctggagcca caggtgaccg 2220
gggcgaactg gggctgctgg tcctgctggt cctgctggtc ctcggggaag ccctggtgaa 2280
cgtggtgagg tcggtcctgc tggccccaat ggatttgctg gtcctgctgg tgctgctggt 2340
caacctggtg ctaaaggaga aagaggagcc aaagggccta agggtgaaaa cggtgttgtt 2400
ggtcccacag gccccgttgg agctgctggc ccagctggtc caaatggtcc ccccggtcct 2460
gctggaagtc gtggtgatgg aggcccccct ggtatgactg gtttccctgg tgctgctgga 2520
cggactggtc ccccaggacc ctctggtatt tctggccctc ctggtccccc tggtcctgct 2580
gggaaagaag ggcttcgtgg tcctcgtggt gaccaaggtc cagttggccg aactggagaa 2640
gtaggtgcag ttggtccccc tggcttcgct ggtgagaagg gtccctctgg agaggctggt 2700
actgctggac ctcctggcac tccaggtcct cagggtcttc ttggtgctcc tggtattctg 2760
ggtctccctg gctcgagagg tgaacgtggt ctaccaggtg ttgctggtgc tgtgggtgaa 2820
cctggtcctc ttggcattgc cggccctcct ggggcccgtg gtcctcctgg tgctgtgggt 2880
agtcctggag tcaacggtgc tcctggtgaa gctggtcgtg atggcaaccc tgggaacgat 2940
ggtcccccag gtcgcgatgg tcaacccgga cacaagggag agcgcggtta ccctggcaat 3000
attggtcccg ttggtgctgc aggtgcacct ggtcctcatg gccccgtggg tcctgctggc 3060
aaacatggaa accgtggtga aactggtcct tctggtcctg ttggtcctgc tggtgctgtt 3120
ggcccaagag gtcctagtgg cccacaaggc attcgtggcg ataagggaga gcccggtgaa 3180
aaggggccca gaggtcttcc tggcttaaag ggacacaatg gattgcaagg tctgcctggt 3240
atcgctggtc accatggtga tcaaggtgct cctggctccg tgggtcctgc tggtcctagg 3300
ggccctgctg gtccttctgg ccctgctgga aaagatggtc gcactggaca tcctggtaca 3360
gttggacctg ctggcattcg aggccctcag ggtcaccaag gccctgctgg cccccctggt 3420
ccccctggcc ctcctggacc tccaggtgta agcggtggtg gttatgactt tggttacgat 3480
ggagacttct acagggctga ccagcctcgc tcagcacctt ctctcagacc caaggactat 3540
gaagttgatg ctactctgaa gtctctcaac aaccagattg agacccttct tactcctgaa 3600
ggctctagaa agaacccagc tcgcacatgc cgtgacttga gactcagcca cccagagtgg 3660
agcagtggtt actactggat tgaccctaac caaggatgca ctatggatgc tatcaaagta 3720
tactgtgatt tctctactgg cgaaacctgt atccgggccc aacctgaaaa catcccagcc 3780
aagaactggt ataggagctc caaggacaag aaacacgtct ggctaggaga aactatcaat 3840
gctggcagcc agtttgaata taatgtagaa ggagtgactt ccaaggaaat ggctacccaa 3900
cttgccttca tgcgcctgct ggccaactat gcctctcaga acatcaccta ccactgcaag 3960
aacagcattg catacatgga tgaggagact ggcaacctga aaaaggctgt cattctacag 4020
ggctctaatg atgttgaact tgttgctgag ggcaacagca ggttcactta cactgttctt 4080
gtagatggct gctctaaaaa gacaaatgaa tggggaaaga caatcattga atacaaaaca 4140
aataagccat cacgcctgcc cttccttgat attgcacctt tggacatcgg tggtgctgac 4200
caggaattct ttgtggacat tggcccagtc tgtttcaaat aaatgaactc aatctaaatt 4260
aaaaaagaaa gaaatttgaa aaaactttct ctttgccatt tcttcttctt ctttttttaac 4320
tgaaagctga atccttccat ttcttctgca catctacttg cttaaattgt gggcaaaaga 4380

gaaaaagaag gattgatcag agcattgtgc aatacagttt cattaactcc ttccccgct 4440
cccccaaaaa tttgaatttt tttttcaaca ctcttacacc tgttatggaa aatgtcaacc 4500
tttgtaagaa aaccaaaata aaaattgaaa aataaaaacc ataaacattt gcaccacttg 4560
tggcttttga atatcttcca cagagggaag tttaaaaccc aaacttccaa aggtttaaac 4620
tacctcaaaa cactttccca tgagtgtgat ccacattgtt aggtgctgac ctagacagag 4680
atgaactgag gtccttgttt tgttttgttc ataatacaaa ggtgctaatt aatagtattt 4740
cagatacttg aagaatgttg atggtgctag aagaatttga gaagaaatac tcctgtattg 4800
agttgtatcg tgtggtgtat tttttaaaaa atttgattta gcattcatat tttccatctt 4860
attcccaatt aaaagtatgc agattatttg cccaaatctt cttcagattc agcatttgtt 4920
ctttgccagt ctcattttca tcttcttcca tggttccaca gaagctttgt ttcttgggca 4980
agcagaaaaa ttaaattgta cctattttgt atatgtgaga tgtttaaata aattgtgaaa 5040
aaaatgaaat aaagcatgtt tggttttcca aaagaaaaaa aaaaaaaaaa aacycgrggg 5100
ggggcccggw acccaattgg ccccangggg ggccgtttac atnca 5145

<210> 207
<211> 487
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (470)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (483)
<223> n equals a,t,g, or c

<400> 207
tccgccctcc cgtcgctccc ctgctcgggg tcagctagtg tcckctctgc tcggccgcgg 60
gctcccggag gactgcaggc aggatgacgc aaaacacggt gattgtgaat ggagttgcta 120
tggcctctag gccatcccag cccacccacg tcaacgtcca catccaccag gagtcagctt 180
tgacacaact gctgaaagct ggaggttctc tgaagaagtt tctttttcac cctggggaca 240
ctgtgccttc cacagccagg attggttatg agcagctggc tctaggggtg actcagatat 300
tgctgggggt tgtgagttgt gttcttggag tgtgtctcag cttggggccc tggactgtgc 360
tgagtgcctc agctgtgcct tctgggcggg gtctgtggtg atcgcarcar gastkgggcc 420
attgtccatg araarcaccc gggcaaactk gytggctata ttscagccgn tcacccggca 480
agntttg 487

<210> 208
<211> 2296
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (202)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (252)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2258)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2285)
<223> n equals a,t,g, or c

<400> 208
gaagaattag gcttggtttc aggttacata aataatagag cagatggttg cctttgggtc 60
ttgaaccaaa ataagactta ctaaaggaag agtgagtttt tagaagagaa ctttacgagc 120
gtgacattat gcattactcc acatccaccc tttaagaatt gatttattac aaaattatgt 180
tctattttaa agtccactcc cncaaaatac tgatttcttc catggattat ttttatatga 240
tttgtacaaa tnttttctga aatttaaatt gacaagcaat gttataaaaa tattgctaat 300
cttctgctta tttttcagcc tttaaagtct gaaatactat aaaacactga gagtatctat 360
gtctttctga atttaaaatg aaaattcatg tccatatgga gacttacata ttccccaatc 420
tttccatgaa ttgcattttt ttctaatact tatctctgtt aagactccat tgaaagttaa 480
acaaaaagcc gatataatag tttgggtttt tttttttgc ttattttagt attttgaatc 540
agagaatact tggccaagct cgtatttgta aactaaaacc ccttgttatt tgtatcttct 600
gcatttcagt tttactgtaa gaacatacat yttgaaatta tgaacatttt tttcataaaa 660
attaaatgct ttaagaaatg gagaaggaaa aatagctttt atcaattttt ttctcctcaa 720
gattctgtaa taaacctcaa agtctggtgt agaatggtat tttcccgttt gaggtcttgg 780
tagttttttt tttttttta aacatggtgc cactttttaat taactaaatg ttacaaaatt 840
ctcagcattt gtttttgtct ggtagtatta ttgagtcttt tcatacactt cttaaaatgt 900
gaaaatctat gttttcagta ttatgacagt atctgcagat actataataa tatgctttgg 960
ccaaatttgc tktttataga gtgaaccaag atgtcagttt tgtattgggg atatgtttta 1020
cataaataga actcatttaa aagtatggtt caagtactgc tcttcttttt atggggaaat 1080
tgatttttaa ggagcgattc ttttcctata taaaagctat tgaggcttag ctttattcat 1140
acatgagtga tttggttata actcaatcaa aatttttatc tttaaatctg agacaagtat 1200
tatatttaaa actagatcta ttaatacatt catcactgcc tgaaaatttg ctgttctaat 1260
gwttgtgaat tttcactcat tacctagagt aaacttattg catattttca taatcagtca 1320
aaataataaa actaaaaaca aaaagtaaaa attagttccc aagtaaatat atcagtgttt 1380
cctgtgtttg ggcagaagtg caaagtagtt ttaatttctc acgttgtaga aaaagaggcc 1440
aaaaaggtca ccttagttta tttttccaaa acataacttt aggtattcta atgtatttttg 1500
ttagttgctt agaaatggaa ataaaatata tgtgcttatt aaataatgca cagtacacta 1560
gattatagag tttatttttg cttttatgct ttaaagaatg catgcccaaa acactactac 1620
caacaagagg attttttaaa atcacagaat tgatatttat ctcaagacta tcttaagcta 1680
atgtacttct gttacataat taaactattt ctgctattat ttttaaagca gtattatttt 1740
ataaccaatt ctaaaattca gctttaaaaa tattgracat accttcctac cacttacgct 1800
tcaagtttca tttattgaat accagggtca tatcttagaa ttgtatataa aacaacatgt 1860
aacccattca tgaaaaacgt ttttaagtat tgctttttgc tgctatgttc tgcattgagc 1920
ctagttttgc cattgtcccc tgaatgtagt attatctata gattatacat aactacatct 1980
attgcttttg gtggtaaatc aagatttagt tgtaattttc cagctgtgaa aatgttgcct 2040
tgtatttaaa agggtttcat gaatggaaac ctaagtaaaa ctaagctcat tagtgacaga 2100
cttgttttct tcttgttatt cctccagcaa ctccctcacc accacgcctc cctgcctacc 2160

atcccccggaa gggtgcttat tctttaacaa agagaatcta aaaaaaaaac aaaaaactgt 2220
tgtctatatt cacgtaatgt cctggcttta ttccctgngt ttagagagca ttcctggttg 2280
tacantgact ttgatg 2296

<210> 209
<211> 625
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (600)
<223> n equals a,t,g, or c

<400> 209
ntctcattcn acacccaacc ttcannttca actacaactt ctccgctttg ggcaaacacc 60
gtcactcttg ctggaggcaa gcttcattcc aaagggttga aatacttcca tcactttacc 120
ctcagtctct gtggaaacca gggtaggaaa atgtctgtgt gcaccgacaa tgtcactgac 180
ctccggattc ctgagggtga gtcagggttc tccaaatcta tcacagccta cgtctgccag 240
gcagtcatca tccccccaga ggtgacaggc tacaaggccg gggtttcctc acagcctgtc 300
agccttgctg atcgacttat tggggtgaca acagatatga ctctggatgg aatcacctcc 360
ccagctgaac ttttccacct ggagtccttg ggaataccgg acgtgatctt cttttatagg 420
tccaatgatg tgacccagtc ctgcagttct gggagatcaa ccaccatccg cgtcaggtgc 480
agtccacaga aaactgtccc tggaagtttg ctgctgccag gaacgtgctc agatgggamc 540
tgtgatggct gcaacttcca cttcctgtgg gaaaamgsgs tgsttgcccg ctctgctcan 600
tggctgacta ccatgctatc gtcac 625

<210> 210
<211> 1551
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (760)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1543)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1544)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1545)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1546)
<223> n equals a,t,g, or c

<400> 210
ttaaggctgt ccgctctggg ctccgcggcc tcggcccgct gcactccacc tccgcccccct 60
cggactccct cccctctgct tctactcctc ctgctccagt gcggatcgtt tcgcaactgc 120
ttgccactcg tcccgtgcct ggctgtttty ccatttcccg gccccctctt cttgagtact 180
ttaccccctg catttgggga cagggactgg aaaaggggcg ggtggagcgt ccagtggaga 240
agaaggaagc gaggcccgca gaggaggagg atcggcggac tgtggggagg agaccccacg 300
ccaccctttc tggtcatctc ccctcccgcc ccgcccctgc gcacactccc tcgcgggcga 360
gctactttcg gaccaggaaa gtaagagcgg ccctgggtga cagcgccgcg gggccagtcc 420
cggggttagc cgcgcgtctg ctcgcttctg gtccgtcgcg ctcccagcca gggcacagcg 480
gaccgaggat ggcttcgacc acaacctgca ccaggttcac ggacgagtat cagcttttcg 540
aggagcttgg aaagggggca ttctcagtgg tgagaagatg tatgaaaatt cctactggac 600
aagaatatgc tgccaaaatt atcaacacca aaaagctttc tgctagggat catcagaaac 660
tagaaagaga agctagaatc tgccgtcttt tgaagcaccc taatattgtg cgacttcatg 720
atagcatatc agaagagggc tttcactact ttggtggttn gattaagtta ctggaggtga 780
actgtttgaa gacatagtgg caagagaata ctacagtgaa gctgatgcca gtcattgcat 840
tcagcagatc ctggaggctg tgctacactg ccatcagatg ggcgtggtcc atcgggacct 900
gaagcctgag aatttgcttt tagctagcaa atccaaggga gcagctgtga aattggcaga 960
ctttggctta gccatagaag ttcaagggga ccagcaggcg tggtttggtt ttgctggcac 1020
acctggatat ctttctycar aagttttacg taaagatcct tatggaaagc cagtggatat 1080
gtgggcatgt ggtgtcattc tctatattct acttgtgggg tatccaccct tctgggatga 1140
agaccaacac agactctatc agcagatcaa ggctggagct tatgattttc catcaccaga 1200
atgggacacg gtgactcctg aagccaaaga cctcatcaat aaaatgctta ctatcaaccc 1260
tgccaaacgc atcacagcct cagaggcact gaagcaccca tggatctgtc aacgttctac 1320
tgttgcttcc atgatgcaca gacaggagac tgtagactgc ttgaagaaat ttaatgctag 1380
aagaaaacta aagggtgcca tcttgacaac tatgctggct acaaggaatt tctcagcagc 1440

caagagtttg ttgaagaaac cagatggagt aaaggagtca actgagagtt caaatacaac 1500
aattgaggat gaattcagct tggacttaac caggttgact cannnngggg g 1551

<210> 211
<211> 1011
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (309)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (801)
<223> n equals a,t,g, or c

<400> 211
tcgacccacg cgtccgggag aatggcggcg gaaggctgga tttggcgttg gggctggggc 60
cggcggtgcc tgggaaggcc tgggcttctc ggccccggcc ctggccccac tacacctctc 120
tttcttcttt tgttgttggg gtctgtgact gcggatataa ctgacggcaa cagtgaacat 180
ctcaagcggg agcattcgct cattaagccc taccaagggg tcggttccag ctctatgccc 240
ctctgggact tccagggcag cactatgctc acgagccagt acgtacgtct gacccctgac 300
gagcgcagna aagagggctc tatctggaac caccagccgt gcttcctcaa agactgggaa 360
atgcacgtcc acttcaaagt ccacggcaca gggaagaaga acctccatgg agacggcatc 420
gccttgtggt acacccggga ccgcctcgtg ccagggcctg tgtttggaag caaagataac 480
ttccacggct tagccatctt cctggacacc taccccaatg atgagaccac tgagcgcgtg 540
ttcccgtaca tctcggtgat ggtgaacaat ggctccctgt cctacgacca cagcaaggat 600
gggcgctgga ccgagctggc gggctgcacg gctgacttcc gcaaccgcga tcacgacacc 660
ttcctggctg tgcgctactc ccggggccgt ctgacggtga tgaccgacct ggaggacaag 720
aacgagtgga agaactgcat tgacatcacg ggagtgcgcc tgcccaccgg ctactacttc 780
ggggcctccg ccggcaccgg nracctgtct gacaatcatg acatcatctc catgaaagct 840
gttccaagct gatggtggaa gcacacgccc gacgaggaga agcatcgact tggaccaaga 900
tcgagcccag cgtcaacttc tcaagtcgcc caaagacaac gtggacgacc ccacggggaa 960
ctttcgcagc gggcccctga mggggtggcg ggtgtttcct gctgctgctg t 1011

<210> 212
<211> 1639
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1630)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1637)
<223> n equals a,t,g, or c

<400> 212
ggcacgagga cgcgccgagg tactaggcag agccgtggaa ccgccgccag gtcgctgttg 60
gtccacgccg cccgtcgcgc cgcccgcccg ctcagcgtcc gccgccgcca tgggagtgca 120
ggtggaaacc atctccccag gagacgggcg caccttcccc aagcgcggcc agacctgcgt 180
ggtgcactac accgggatgc ttgaagatgg aaagaaattt gattcctccc gggacagaaa 240
caagcccttt aagtttatgc taggcaagca ggaggtgatc cgaggctggg aagaaggggt 300
tgcccagatg agtgtgggtc agagagccaa actgactata tctccagatt atgcctatgg 360
tgccactggg cacccaggca tcatcccacc acatgccact ctcgtcttcg atgtggagct 420
tctaaaactg gaatgacagg aatggcctcc tcccttagct ccctgttctt ggatctgccr 480
tggagggatc tggtgcctcc agacatgtgc acatgartcc atatggagct tttcctgatg 540
ttccactcca ctttgtatag acatctgccc tgactgaatg tgttctgtca ctcagctttg 600
cttccgacac ctctgtttcc tcttcccctt tctcctcgta tgtgtgttta cctaaactat 660
atgccataaa cctcaagtta ytcattttat tttgttttca ttttggggtg aagattcagt 720
ttcagtcttt tggatatagg tttccaatta agtacatggt caagtattaa cagcacaagt 780
ggtaggttaa cattagaata ggaattggtg ttgggggggg gtttgcaaga atattttatt 840
ttaatttttt ggatgaaatt tttatctatt atatattaaa cattcttgct gctgcgctgc 900
aaagccatag cagatttgag gcgctgttga ggactgaatt actctccaag ttgagagatg 960
tctttgggtt aaattaaaag ccctacctaa aactgaggtg gggatgggga gagcctttgc 1020
ctccaccatt cccacccacc ctccccttaa accctctgcc tttgaaagta gatcatgttc 1080
actgcaatgc tggacactac aggtatctgt ccctgggcca gcagggacct ctgaagcctt 1140
ctttgtggcc tttttttttt ttcatcctgt ggtttttcta atggactttc aggaattttg 1200
taatctcata actttccaag ctccaccact tcctaaatct taagaacttt aattgacagt 1260
ttcaattgaa ggtgctgttt gtagacttaa cacccagtga aagcccagcc atcatgacaa 1320
atccttgaat gttctcttaa gaaaatgatg ctggtcatcg cagcttcagc atctcctgtt 1380
ttttgatgct tggctccctc tgctgatctc agtttcctgg cttttcctcc ctcagcccct 1440
tctcacccct ttgctgtcct gtgtagtgat ttggtgagaa atcgttgctg caccettccc 1500
ccagcaccat ttatgagtct caagttttat tattgcaata aaagtgcttt atgccggctt 1560
ttctcaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1620
aaaaaaaaan ggggggnncc 1639

<210> 213
<211> 2127
<212> DNA
<213> Homo sapiens

<400> 213
ttgaggttct gggggtcctg gagacttacc attgagccat gcaatctggg aagcacagga 60
ataagtagac actttgaaaa tggatttgaa tgttctcatc ccttttgcag cttttctttt 120
tggctctctc atgtccttgg cttgctcctc tattctacct ctctttctcc agcaataata 180
tgcaaatgaa gacatgtatc cataagaagg agtgctcttc atcaactaat agagcaccta 240
ccacagtgtc atacctggta gaggtgagca attcatattc aaaggttgca aagtgtttgt 300
aatatattca tgaggctgga akkaagaaga attaaaaatt tgtcctaatt acaatgagaa 360
ccattctagg tagtgatctt ggagcacaca tgaataactt tctgaaggtg caaccaaatc 420
catttttatt tctgcctggc ttggtcacct ctgtaaaggt ttaacttagt gttgtcaagt 480
aacagttact gaaagagctg agaaaaagaa caatgaacag caacgatctt gactgtgcaa 540
ctcagacatt cctgcagaaa agacatatgt tgctttacaa gaaggccaaa gaactatggg 600
gccttcccag catttgactg ttcattgcat agaatgaatt aaatatccag ttacttgaat 660
gggtataacg catgaatatt tgtgtgtctg tgtgtgtgtc tgagttgtgt gattttatta 720
ggggcatctg ccaattctct cactgtggtt ccttctctga ctttgcctgt tcatcatcta 780
aggaggctag atccttcgct gacttcacca ttcctcaaac ctgtaagttt ctcacttctt 840

ccaaattggc tttggctctt tcttcaacct ttccattcaa gagcaatctt tgctaaggag 900
taagtgaatg tgaagagtac caactacaac aattctacag ataattagtg gattgtgttg 960
tttgttgaga gtgaaggttt cttggcatct ggtgcctgat taaggcttga gtattaagtt 1020
ctcagcatat ctctctattg tcttgacttg agtttgctgc attttctatg tgctgttcgt 1080
gacttggaga acttaaagta atcgagctat gccaacttgg ggtggtaaca gagtacttcc 1140
caccacagtg ttgaaaggga gagcaaagtc ttatggataa accctccttt cttttgggga 1200
cacatggctc tcacttgaga agctcacctg tgctgaatgt ccacatggtc actaaacatg 1260
ttatccttaa acccccgta tgcctgagtt gaaagggctc tctcttatta ggttttcatg 1320
ggaacatgag gcagcaaatc tattgctaag actttaccag gctcaaatca tctgaggctg 1380
atagatattt gacttggtaa gacttaagta aggctctggc tcccaggggc ataascaaca 1440
gtttcttgaa tgtgccatct garaagggag acccaggtta tgagttttcc tttgaacaca 1500
ttggtctttt ctcaaagttc ctgccttgct agactgttag ctctttgagg acagggacta 1560
tgtcttatca atcactatta ttttcctgtt acctagcatg ggacaagtac acaacacata 1620
tttgttcaat gaatgaatga atgtcttcta aaagactcct ctgattggga gaccatatct 1680
ataattggga tgtgaatcat ttcttcagtg gaataagagc acaacggcac aaccttcaag 1740
gacatattat ctactatgaa cattttactg tgagactctt tattttgcct tctacttgcg 1800
ctgaaatgaa accaaaacag gccgttgggt tccacaagtc aatatatgtt ggatgaggat 1860
tctgttgcct tattgggaac tgtgagactt atctggtatg agaagccagt aataaacctt 1920
tgacctgttt taaccaatga agattatgaa tatgttaata tgatgtaaat tgctatttaa 1980
gtgtaaagca gttctaagtt ttagtatttg ggggattggt ttttattatt tttttccttt 2040
ttgaaaaata ctgagggatc ttttgataaa gttagtaatg catgttagat tttagttttg 2100
cagagcatgt tgtttaacaa ataaagg 2127

<210> 214
<211> 1166
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1163)
<223> n equals a,t,g, or c

<400> 214
gcggacgcgt gggcggacgc gtgggcggac gcgtgggcgg gtcgcttggt ggctccgtct 60
gtctgtccgt ccgcccgcgg gtgccatcat ggcggacgcg gccagtcagg tgctcctggg 120
ctccggtctc accatcctgt cccagccgct catgtacgtg aaagtgctca tccaggtggg 180
atatgagcct cttcctccaa caataggacg aaatattttt gggcggcaag tgtgtcagct 240
tcctggtctc tttagttatg ctcagcacat tgccagtatc gatgggaggc gcgggttgtt 300
cacaggctta actccaagac tgtgttcggg agtccttgga actgtggtcc atgggtaaagt 360
tttacagcat taccaggaga gtgacaaggg tgaggagtta ggacctggaa atgtacagaa 420
agaagtctca tcttcctttg accacgttat caaggagaca actcgagaga tgatcgctcg 480
ttctgctgct accctcatca cacatccctt ccatgtgatc actctgagat ctatggtaca 540
gttcattggc agagaatcca agtactgtgg actttgtgat tccataataa ccatctatcg 600
ggaagagggc attctaggat ttttcgcggg tcttgttcct cgccttctag gtgacatcct 660
ttctttgtgg ctgtgtaact cactggccta cctcgtcaat acctatgcac tggacagtgg 720
ggtttctacc atgaatgaaa tgaagagtta ttctcaagct gtcacaggat tttttgcgag 780
tatgttgacc tatccctttg tgcttgtctc caatcttatg gctgtcaaca actgtggtct 840
tgctggtgga tgccctcctt actccccaat atatacgtct tggatagact gttggtgcat 900
gctacaaaaa gaggggaata tgagccgagg aaatagctta tttttccgga aggtcccctt 960
tgggaagact tattgttgtg acctgaaaat gttaatttga agatgtgggg cagggacagt 1020

gacatttctg tagtcccaga tgcacagaat tatgggagag aatgttgatt tctatacagt 1080
gtggcgcgct tttttaataa tcatttaatc ttgggaaaaa aaaaaaaaaa aaaaaaaaaa 1140
aacggggggg gcccggaacc canttc 1166

<210> 215
<211> 3323
<212> DNA
<213> Homo sapiens

<400> 215
ggggcaaaaa ggccgagggg gcccagaatc agggcaaaaa ggccgagggg gcccagaacc 60
agggcaagaa ggcmgagggg gcccagaacc agggcargaa ggccgagggg gcccagaacc 120
aggrcaagaa ggccgagggg rcccmkaacc agggcargaa ggccgagggg gcccmgaacc 180
agggcargaa ggccgagggg gcccagaacc agggcaagaa ggccgagggg gcccagaayc 240
agggcaagaa ggccgagggg gcccagaayc agggcaagaa ggccgagggg gcccagaayc 300
agggcaagaa ggccgagggg gcccagaacc agggcaagaa ggccgagggk gctcagaacc 360
agggcaaaaa agtakaaggg gcccagaacc agggcaagaa ggctgagggg gcccagaacc 420
agggcaagaa ggccgagggg gctcagaacc agggcaaaaa ggccgaggga gcccagaacc 480
agggccaaaa aggagaggga gcccagaatc agggtaaaaa gacagaaggg gctcagggca 540
aaaaggcaga aaggagtccc aaccaaggca aaaaaggaga gggagctccc atccagggca 600
aaaaggcaga ttcggttgct aatcagggca caaaggtaga gggtattaca aaccagggga 660
aaaaagcaga agggtccccc agtgaaggca aaaaggcaga agggtccccc aaccaaggca 720
aaaaggcaga cgcagctgcc aatcagggta aaaagacaga gtcagcttct gtccagggca 780
gaaatacaga tgtggcccag agcccagagg caccaaagca agaggctcct gccaagaaga 840
agtctggttc aaagaaaaaa ggtgagcctg ggcccccaga tgccgacggc cctctctacc 900
tcccctacaa gacgctggtc tccacggttg ggagcatggt gttcaacgag ggcgaggccc 960
agcggctcat cgagatcctg tctgagaagg ctggcatcat tcaggacacc tggcacaagg 1020
ccactcagaa gggtgaccct gtggcgattc tgaaacgcca gytggaagag aaggaaaaac 1080
tgctggccac agaacaggaa gatgcggctg tcgccaagag caaaytgagg gagctcaaca 1140
aggagatggc agcagaaaag gccaaagcag cagccgggga ggccaaagtg aaaaagcagc 1200
tggtggcccg ggagcaggag atcacggctg tgcaggcacg catgcaggcc agctaccggg 1260
agcacgtgaa ggaggtgcag cagctgcagg gcaagatccg gactcttcag gagcagctgg 1320
agaatggccc caacacgcag ctggcccgcc tgcagcagga gaactccatc ctgcgggatg 1380
ccttgaacca ggccacgagc caggtggaga gcaagcagaa cgcagagctg gccaagcttc 1440
ggcaggagct cagcaaggtc agcaaagagc tggtggagaa gtcagaggct gtgcggcaag 1500
atgagcagca gcggaaagct ctggaagcca aggcagctgc cttcgagaag caggtcctgc 1560
agctgcaggc gtcccacagg gagagtgagg aggccctgca gaagcgcctg gacgaggtca 1620
gccgggagct gtgccacacg cagagcagcc acgccagcct ccgggcggat gccgagaagg 1680
cccaggagca acagcagcag atggccgagc tgcacagcaa gttacagtcc tccgaggcgg 1740
aggtgcgcag caaatgcgag gagctgagtg gcctccacgg gcagctccag gaggccaggg 1800
cggagaactc ccagctcaca gagagaatcc gttccattga ggccctgctg gaggcgggcc 1860
aggcgcggga tgcccaggac gtccaggcca gccagscgga ggctgaccag cagcagactc 1920
gcctcaagga gctggagtcc caggtgtcgg gtctggagaa ggaggccatc gagctcaggg 1980
aggccgtcga gcagcagaaa gtgaagaaca atgacctccg ggagaagaac tggaaggcca 2040
tggaggcact ggccacggcc gagcaggcct gcaaggagaa gctgcactcc ctgacccagg 2100
ccaaggagga atcggagaag cagctctgtc tgattgaggc gcagaccatg gaggccctgc 2160
tggctctgct cccagaactc tctgtcttgg cacaacagaa ttacaccgag tggctgcagg 2220
atctcaaaga gaaaggcccc acgctgctga agcacccgcc agctcccgcg gagccctcct 2280
cggacctggc ctccaagttg agggaggccg aggagacgca gagcacactg caggccgagt 2340
gtgaccagta ccgcagcatc ctggcggaga cggagggcat gctcagagac ctgcagaaga 2400
gcgtggagga ggaggagcag gtgtggaggg ccaaggtggg cgccgcagag gaggagctcc 2460

agaagtcccg ggtcacagtg aagcatctcg aagagattgt agagaagcta aaggagaac 2520
ttgaaagttc ggaccaggtg agggagcaca cgtygcattt ggaggcagag ctggaaaagc 2580
acatggcggc cgccagcgcc gagtgccaga actacgccaa ggaggtggca gggctgaggc 2640
aacttctcct agaatctcaa tctcagctcg atgccgccaa gagcgaagcc agaaacagag 2700
cgatgagctt gccctggtca ggcagcagtt gagtgaaatg aagagccacg tagaggatgg 2760
tgacatagct ggggccccag cttcctcccc agaggcgccc ccagccgagc aggaccccgt 2820
tcagctgaag acgcagctgg agtggacaga agccatcctg gaggatgagc agacacagcg 2880
gcagaagctc acggccgagt ttgaggaggc tcagacctcg gcatgtcggt tacaagaaga 2940
attggagaag ctccgcacag ccggccccct agagtcttca gaaacagagg aggcctcaca 3000
gctgaaggag agactagaaa aagagaagaa gttaacaagt gacctggggc gcgccgccac 3060
gagactgcag gagcttctga agacgaccca ggagcagctg gcaagggaga aggacacggt 3120
gaagaagctg caggaacagc tggaaaaggc agaggacggc agcagctcaa aggagggcac 3180
ctctgtctga gtttcctctt tggaaaaaga agttactgtt caacttacca aaatgcctta 3240
cacattcctt acaaataaac caaccaacct acaaaaaaaa aaaaaaaaaa aactcgaggg 3300
ggggcccggt acccaattcg ccc 3323

<210> 216
<211> 1408
<212> DNA
<213> Homo sapiens

<400> 216
taaactattt atcttgtgtg tgtacatttg tgggtggagt ttgtgcgcct ggtttttttg 60
tttggaaaac actgcgtggt caatgtggtt atgggggga gtgatgcatt tttttctagt 120
cttaaaacta aaaacttgag tctaccattt cttggttgca ctgaaaatac cgcccagcct 180
gatggtgttc ccgtgctgtc cctcccccctt cccttctccc cgcgtctacc tccccacccc 240
gttctgttcc ccctccctcc ttctccctct ccctcaaatc cgtgagtttt ggaagcccca 300
gggcctctct cccccgcccc tcctggatga ggccaccatc ccccaaaccg gcttgttttg 360
cagtttcccc aggatcctgg aagctcgctg gcgctcgagg gtggcgggga cacgggggg 420
tgggtgaagg ttcgttacct tttctagtgc gttctatcat agttaacggt tgcacacttt 480
tttaaaaaaa gtaaatggat ttgccacaat taaatgtcat aacatttatg acagaatata 540
aaatattaac atattttaag ccaagtttta ggtgtatttt ttgaatcttg gttataaacc 600
caattttaaa gggcgatgta tccagcgttg tgaaggcaac agagtgtacc catatttata 660
tttttataaa atacctataa gactgtgaat ctcttgtgct aatggctgag ttaattgaag 720
gatcgttttg cccctttta gcctcccaga gcttcgagga ctcaattcga acccgaaatc 780
ctgccgtggg ggaggggttg cgtcgagacc tgggcccggg gaggttctcc tgcgtcactt 840
tctgtcctga aaggcgccct tcctggtttc tgtggctcca attttctatg cagccccaca 900
ccccttgttg ttttgatcct gagaaataaa agggaggctg aattattcaa atttaaatga 960
ggtttcccct tcatggaagt gctgctgacc cttcgtgcag aaatggggag cacttgagga 1020
cacaggtggg tggaggccct ttgtgcgtgg ctggtcgtat tcgggcagcc ctccgtcgct 1080
ttttataaaa ctttgtgtga gaagaatata ttgataatgt cagtgaaaca agcagacatt 1140
gaaatggagg cacagattac tccacaagga gttcttctgt atattttttc tagatgcaaa 1200
taccttttta attatgttaa ttaatgttaa gactttctag gcttatatcg aagctgtgtg 1260
tgggtcacgg ggtgatcact gctaactgga taaagtttgt gcagcacatt cctgagtgta 1320
cgatattgac ctgtagccca gcgtgaaaaa tttataaata aatttttcat tgatcttttt 1380
atattaaaaa aaaaaaaaaa aaaaaaa 1408

<210> 217
<211> 2111
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2102)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2104)
<223> n equals a,t,g, or c

<400> 217
ggcacgagga gcattccata tagaaactgc tgaaactgcc acaggtgctt ctccgaaaac 60
cttacagttg tggcattgaa tgttcagtat cgcttccttt ctgcacacga ggcatactgt 120
tgagcctgag aaatgccagt ggcctgacag cagcagacat tgcacaaacc cagggtttcc 180
aagagtgtgc ccagtttctc ttgaacctcc agaattgtca tctgaaccat ttctataaca 240
atggcatctt aaatgggggt catcagaatg tatttcctaa tcatattagt gtgggaacaa 300
atcgaaagag atgcttggga agactcagaa gactttggag taaagaaagc tagaactgaa 360
gctcaaagct tggattctgc cgtgccactc acgaatggcg acacagaaga cgatgctgac 420
aaaatgcacg ttgataggga gtttgctgtt gtaacagata tgaaaaacag tagctccgta 480
tcgaatacat tgacaatgga tgtgtcatca atggacattt ggacttcccc tccacgaccc 540
cgctcagtgg gatggaaagc aggaatggcc agtgcttgac aggaactaac ggaattagca 600
gtggattagc cccaggacag ccgtttccga gtagccaggg ttctctctgc attagtggga 660
ctgaggagcc agagaagacc ctgagagcta accctgagtt gtgcggttct ctgcacctga 720
acgggagtcc aagtagctgc atagccagta ggccttcctg ggtggaagac attggggata 780
acctgtacta tggacactac cacgggtttg gggacactgc tgaaagcatg cccagaactg 840
aacagtgtgg tcgagcattc caagtccgtg aaggtgcagg agcggtacga cagtgccgtg 900
ctgggcacca tgcacctgca ccacggctcc tagagacgct gacctggctc tcggaaacgc 960
aggagtcctt cctggtagcc agctcagaat acccatgtag cagcaacttg aacgaatgtc 1020
acaacttgta cttttttat atacttcaac tttctgaaaa agtaaacttc gacaagttcc 1080
cagcaactgc ttgtttgtgc atgagtaggg cttactaagt gcatagatgt ttctacagtg 1140
aggtgtcctt tttataaggt gcacttttgg agtttttctg atgccaatct caacattgtc 1200
tttttaatac tgtcaccaga tattgccatt tttcttttg ttaaaagatt atatgatcaa 1260
gataaattgg ggtggtaaat caggtgcctg gtaatttatc tctttgcaca tgggcatcat 1320
tttaaaaagc ttgcttccac tcttttctgt agaatttgac ggaacacagc tatttcccta 1380
tgcaaggtac agccttacaa agatttctgc agtgatttgt gtgaagaaga gaatgtttgt 1440
ctttttcaat gaagctttgc agatcaccat gtggttgaag gttttagttg tggacacagt 1500
ggtccctcct taatgatgaa gatcactgcc ttgggcttca tggaaaacag gcccagcctg 1560
gggctgcgtt tggatttatt gtttttattc cacacttcct acttggtctc tggaagtttt 1620
accacatgta acagattcct ttatatgtag tgaaaatcac tatttgtaga aactgtcagg 1680
tcaaaatatt taactgactg ttgacatgta ttttcttttt tccttgtttt tgtttttttgg 1740
ggtttctgc tttaagatat ataccactat gtatatccag ttaactgaga gaattttgac 1800
tctcttaata aaactgcatt aagtttttga ttttgtagaa attagctttt gtctaggcaa 1860
ctagtggtta tactctgcaa atattgtaat gaatttttac ttttttgatt tttgtaataa 1920
aaattggtgc agataaaatg tcaaatgaac aaaccagtgt tctaagagtg ttactaacat 1980
tttgttctaa aactgtcctt cacaaattga ataaaaaact ctcacactca aaaaaaaaaa 2040
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 2100
ananaaaaaa a 2111

<210> 218
<211> 2493

<212> DNA
<213> Homo sapiens

<400> 218
ggcccggtgg ggccggccgg gactcgccgc tcgcacgccc ttgggccgcg gccgggcgcc 60
cgctcttcct tccgcttgcg ctgtgagctg aggcggtgta tgtgcggcaa taacatgtca 120
accccgctgc ccgccatcgt gcccgccgcc cggaaggcca ccgctgcggt gattttcctg 180
catggattgg gagatactgg gcacggatgg gcagaagcct ttgcaggtat cagaagttca 240
catatcaaat atatctgccc gcatgcgcct gttaggcctg ttacattaaa tatgaacgtg 300
gctatgcctt catggtttga tattattggg ctttcaccag attcacagga ggatgaatct 360
gggattaaac aggcagcaga aaatataaaa gctttgattg atcaagaagt gaagaatggc 420
attccttcta acagaattat tttgggaggg ttttctcagg gaggagcttt atctttatat 480
actgccctta ccacacagca gaaactggca ggtgtcactg cactcagttg ctggcttcca 540
cttcgggctt cctttccaca gggtcctatc ggtggtgcta atagagatat ttctattctc 600
cagtgccacg gggattgtga ccctttggtt cccctgatgt ttggttctct tacggtggaa 660
aaactaaaaa cattggtgaa tccagccaat gtgaccttta aaacctatga aggtatgatg 720
cacagttcgt gtcaacagga aatgatggat gtcaagcaat tcattgataa actcctacct 780
ccaattgatt gacgtcacta agaggccttg tgtagaagta caccagcatc attgtagtag 840
agtgtaaacc ttttcccatg cccagtcttc aaatttctaa tgttttgcag tgttaaaatg 900
ttttgcaaat acatgccaat aacacagatc aaataatatc tcctcatgag aaatttatga 960
tcttttaagt ttctatacat gtattcttat aagacgaccc aggatctact atattagaat 1020
agatgaagca ggtagcttct tttttctcaa atgtaattca gcaaaataat acagtactgc 1080
caccagattt tttattacat catttgaaaa ttagcagtat gcttaatgaa aatttgttca 1140
ggtataaatg agcagttaag atataaacaa tttatgcatg ctgtgactta gtctatggat 1200
ttattccaaa attgcttagt caccatgcag tgtctgtatt tttatatatg tgttcatata 1260
tacataatga ttataataca taataagaat gaggtggtat tacattattc ctaataatag 1320
ggataatgct gtttattgtc aagaaaaagt aaaatcgttc tcttcaatta atggcccttt 1380
tattttggga ccaggctttt attttccctg atattatttc tatttaatac tcttttctct 1440
caagaaaaaa aaaaaagttt gtttttttctt tattgtcctt catagcaggc caagtattgc 1500
ctctctgcaa tagacagcta ctgtcaatac atgctgtaat ttgacattct gggtcacaga 1560
tataaggtat ttaaaatcta tttatgcttt atagagaaac cagacattaa aacttcatgc 1620
actacttatt tcgaattact gtaccttatc caaatttaca cctagctatt aggatcttca 1680
acccaggtaa caggaataat tctgtggttt cattttctg taaacaactg aaagaataat 1740
tagatcatat tctagtatgt tctgaaatat ctttaagact gatcttaaaa actaacttct 1800
aagatgattt catcttctca tagtatagag tttactttgt acacgtttga aaccaactac 1860
tgtagaagat gaggaatcta ttgtaatttt ttgctttatt ttcatctgcc agtggactta 1920
tttgaaattt tcactttagt caaattattt tttgtattag tttttgatgc agacataaaa 1980
atagcaatca ttttaaattg tcaaaatttc cagattactg gtaaaaatta tttgaaaaca 2040
aacttatggg taataaaggc tagtcagaac cctataccat aaagtgtagt taccatacag 2100
attaatatgt agcaaaaatg tatgcttgat atttctcaac tgtgttaatt tttctgctgt 2160
attccagctg accaaaacaa tattaagaat gcatctttat aaatgggtgc taattgataa 2220
tggaaataat ttagtaatgg actatacagg atgttaataa tgaagccata tgtttatgtc 2280
tggatttaaa aattttaaac aatcatttac tatgtcattt ttctttacct tgaagaacat 2340
aaactgttat ttcacttcta caaatcagca agatattatt tatggcaaga aatattccat 2400
tgaaatattg tgctgtaaca tgggaaagtg taaatgtttt tcatggtttc tatcaatgtg 2460
aaataaaatt taattctgaa aaaaaaaaaa aaa 2493

<210> 219
<211> 1259
<212> DNA
<213> Homo sapiens

<400> 219
gcgccgcggt gccggaaccg ctgggcggga gcgaggcggt gcggctgcag ctgcagggcg 60
aggagctgcg gctgcaggag gagagcgtgc ggctgcacca gattaacatc tacctcagcg 120
accgcatctc actgcaccgc cgcctgcccg wgcgctggaa cccgctgtgc aaagagaaga 180
aatatgatta tgataatttg cccaggacat ctgttatcat agcattttat aatgaagcct 240
ggtcaactct ccttcggaca gtttacagtg tccttgagac atccccggat atcctgctag 300
aagaagtgat ccttgtagat gactacagtg atagagagca cctgaaggag cgcttggcca 360
atgagctttc gggactgccc aaggtgcgcc tgatccgcgc caacaagaga gagggcctgg 420
tgcgagcccg gctgctgggg gcgtctgcgg cgargggcga tgttctgacc ttcctggact 480
gtcactgtga gtgccacgaa gggtgctgga gccgctgctg cagaggatcc atgaagagga 540
gtcggcagtg gtgtgcccgg tgattgatgt satcgactgg aacaccttcg aatacctggg 600
gaactccggg gagccccaga tcggcggttt cgactggagg ctggtgttca cgtggcacac 660
agttcctgag agggagagga tacggatgca atccccccgtc gatgtcatca ggtctccaac 720
aatggctggt gggctgtttg ctgtgagtaa gaaatatttt gaatatctgg ggtcttatga 780
tacaggaatg gaagtttggg gaggagaaaa cctcgaattt tcctttagga tctggcagtg 840
tggtggggtt ctggaaacac acccatgttc ccatgttggc catgttttcc ccaagcaagc 900
tccctactcc cgcaacaagg ctctggccaa cagtgttcgt gcagctgaag tatggatgga 960
tgaatttaaa gagctctact accatcgcaa cccccgtgcc cgcttggaac cttttgggga 1020
tgtgacagag aggaagcagc tccgggacaa gctccagtgt aaagacttca agtggttctt 1080
ggagactgtg tatccagaac tgcatgtgcc tgaggacagg cctggcttct tcgggatgct 1140
ccagaacaaa ggactaacag actactgctt tgactwtaac cctcccgatg aaaaccagat 1200
tgtgggacac caggtcattc tgtacctctg tcatgggatg ggccagaatg acctggtgc 1259

<210> 220
<211> 1849
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (920)
<223> n equals a,t,g, or c

<400> 220
ctgttgtatg gagcagggtg tgtgggtttt ctgggcccat cattatggct gcttcagagt 60
cagaagaaag ccatagggca gtaggggagc tcctattgcc tagcccctct ccctttgtgg 120
ctcccactct agctgcctat ttttgctcat cagctggtga gtcagtatgg gccagcagtt 180
ctccctccct aagcccttgc tactttatgg gttagctttg caggtttggt ggcttgaggg 240
gtgggggcaa ctcaccactg ccaggtaact ccctgaaggg tgggagtgga ttatcttcta 300
ggctcttacc cgcggtaggg aagggcatca acactgtctt ccttccattc tcctttcccc 360
catcccattt agtgctgcca cagggcagaa gcacacaaac caaccacaca gtctctgact 420
tctcctaagc actttgagtt gttgaatggg gctcaggggc aagagttttt gctgccctcc 480
ccagcgtggt cacagggtta ttgaactgcc tgcacttgtt tctcatgcaa ctccagcatt 540
ttccccagaa gttgaactat ggatagcagc ttggtatgga tttcctaaat cttaacattt 600
gaagcagctt cttgaggctg gcaactatcc tggtttctgt cttggagggg gtggtttgtt 660
tgctggggcc caacgtctgt cccaagtggt ggggtgagag taagttaact ttggtgccag 720
gtgagaggtg ggggctcttt gcttagactc cctatcatgg aaagattgga gttttctatg 780
cagggcactg gggaaaagga ttgctgattc tgactgaccc tgatcagaga gattaggatt 840
gtattttgac ataggatttg gaacccatct aaatgttgaa gttccctgag acagctctcc 900
agctgctgag cctgcgccan gggctaagca gcccctaatg agaggctctg ctccctttcc 960

cacctcgcca atgttgttgt tgctgccttt ttgatttgta tcctctgtta tagacatttt 1020
ttaaaaacga tttcctcttt cattgtgcac aagtgctgag agtctgaggc cccatttctg 1080
ctgtgtatat atatcctgac tcggggcttt tattcagcaa actgttcatt cttctgtcag 1140
acaatgtcat attcaactct gttcatatta aaccactgtg aagcaagcct ctgttttcct 1200
gcttaagttg taaatttagt attctttagt gtctaggata tgctgggtat tatgcagaaa 1260
tcatacagtg tggccagtgt cctgaggtaa tgttttgcat ttaaattttt ttagaaagca 1320
gaatcttaac ttatcttaat gatatttacc tatccttttt gcaactcaca actgactttg 1380
tcacagaggt aatgcatctg cttgcaggaa gtarctgtag gctcagtacc tgttgkttga 1440
gtcagattta gcagatttgg tttttaagct tgtgggtttg kgctaatttg ggcagaatat 1500
atttattata tatgtgtgtg tgtatgtktg tatgtgtgtg tctgcatatg taatacatgt 1560
acataaacac acatgcatgt gttcatcctc tgacacaccc acacaacacc aacaaacatt 1620
tcttctatag gctttttatc tcaactgaca ctgttttttt tcccaaataa atttgacaca 1680
ggcagaaagg tgggtgaact ctcagaactt ttggtgggtg gatattcatc tgaccagtga 1740
gctctgaaat ggtttcccta cacagagtgg gttttggcaa gggttggaat gaggggaggt 1800
agcagtcttg tcatttagaa aatcaaagct agttttgatg tagctcaac 1849

<210> 221
<211> 1267
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1244)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1252)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1264)
<223> n equals a,t,g, or c

<400> 221
cggattatgc ngamacnccc cagggnttrt gctatgacgt cgcatgcacg cgtaagcttg 60
ggcccctcga gggatcctct agagcggccg ccgcggcatt cggggaatct gcagggcaga 120
tgagtaacga aagaggcttt gaaaatgtag aactgggagt cataggaaaa aagaagaaag 180
tcccaaggag agtcatccac tttgttagtg gtgaaacaat ggaagaatat agcacagatg 240
aagacgaagt tgatggcctg gagaagaaag atgttttgcc tactgttgat ccgacaaaac 300
ttacctgggg tccctactta tggttttaca tgcttcgggc tgctacatca actctctcag 360
tgtgtgactt ccttggagag aagattgcat ctgttttggg tatcagcacc ccaaagtacc 420
aatatgccat tgatgaatat tatcggatga agaaggagga agaagaagaa gaagaagaaa 480
acaggatgtc tgaagaagca gaaaaacaat atcaacagaa taaattgcag actgattcca 540
ttgttcagac agatcaacca gagacagtga tatccagctc atttgtgaat gtcaattttg 600
aaatggaggg agacagtgaa gtaattatgg aaagcaagca aaatccagtc tctgtcccac 660
cataaaatga aatgactatc aagcttcaaa ctcttaagtt tttttttttt aatacaaaaa 720
ctttcacatt ctttattcag tgggacttaa tacaattatt tatattttaa attattaaag 780
tatctggaaa gggaaaatgt tttcttcatt tttaggatct atctagcaaa agccagatct 840
gaaattcaga tatttgtact gtttttactg tgtatagaaa ttagtgcttt ggttttaaaa 900
tgatctttta aaaaagttaa ggacatccta gagccttaat agttaagaag agttaaatta 960
tcaagcctat ttgtgcattt gctttttttg aaaaaggtaa gttgctgatt aagtctaatt 1020
ggaattgata attccatagt cttagattaa aatgaggata ttttctccta gattttctca 1080
tgttatgcca tgcatttata tatctaacca ttaatttcac actaaggatg cttcaccata 1140
taataaaagg agcaagatgg aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1200
aaaaggggcg gacgcgtggg tccgacccgg gaattcccgg atcngtcact gncgggctga 1260
cttntct 1267

<210> 222
<211> 754
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (702)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (710)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (754)
<223> n equals a,t,g, or c

<400> 222
cagagaactg agatgaaagc aatgatgaag ggaccctggg accctgcctt tcctctccct 60
actcagcagg agcttatgaa gtcatctcac tttctcttct gtccccccctc tcctcttcat 120
gcaggtataa agaaatatga ggccccaatt ggaacagcag catggagggt cccagttggg 180
tccccaacgt gctccccatg ggcaagacaa tggaaacttc cacaagcagg gaaggcaaac 240
cctctttatt gaacattagc cagcccagcc cagaccccag ggctgctaag gacacagaga 300
ttctccatgg gaaggggact gccaagcatg aggaaataga agattcaggg gcctgarctc 360

tggaagctgc aagcaaaagg gatgggacta gggctgagtt gtgtctycat tttgataagg 420
aaaggatatg ctcacactct tgcttgttca gattccaaga cagaaggctt cacaaggcca 480
acgcctggaa aatgggcatc tctccctccc atgttaagct ttaacctctg taatctgcct 540
gtatctatag gtgggcatct cactccatca aaggagccca gcctcttttg tcctctacca 600
tgcacagtct ttctgtgcat ttccccaagc tgggccctct tctactctca tttaggcctg 660
tgataactca ttacccaccc atcacttgtg tcttcagggc anacttggcn aagcagggaa 720
ttgccttgga cataaattga agggcactcc tttn 754

<210> 223
<211> 1258
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1205)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1241)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1247)
<223> n equals a,t,g, or c

<400> 223
aacgatacag ccaaggmgat caccatcaac aagattctkt nccaacgwga gccttgtgca 60
ggagaacctg tacttccagc gctgcctaga ctggaaccgt gacatcctca agaaggagct 120
gggactgaca gagcaggaca tcattgacct gcccgctctg ttcaagatgg acgaggacca 180
ccgtgccaga gccttcttcc caaacatggt gaacatgatc gtgctggaca aggacctggg 240
catccccaag ccattcgggc cacaggttga ggaggaatgc tgcctggaga tgcacgtgcg 300
tggcctcctg gagcccctgg gcctcgaatg caccttcatc gacgacattt ctgcctacca 360
caaatttctg gggaagtcc actgtggcac caacgtccgc aggaagccct tcaccttcaa 420
gtggtggcac atggtgccct gaccctccag gggccctggc gtttgcctcc ttmgcttart 480
tctccagacc ctycctcaca ygcccagagc cttctgctga catggactgg acagccccgc 540
tgggagacct ttgggacgtg gggtggaatt tggggtatct gtgccttgcc ctccctgaga 600
ggggcctcag tgwcctctga agccatcccc agtgagcctc gactctgtcc ctgctgaaaa 660
tagctgggcc agtgtctctg tagccctgac ataaggaaca gaacacaaca aaacacagca 720
aaccatgtgc ccaaactgct ccccaaaraa ttttgagtct ctaatctgac actgaatgag 780
gggagaaggg aaggagattc tgggattgcc agttcttcca gcagccatgc tctgaaaatc 840
aaggtagaat ccatggaaag ggaccccagg accccgggac cctagacgta tcttgaactg 900
ccatcgtcat ttcaaataca tctccctcag ggtttccagg tggccacccc caatwattca 960
ttccttacca acctctcaaa tcctcttggc tttctctctg cagtgtggac actgttggct 1020

agtcctcccc actccctgag ggtccagtaa gttagcttag aaccttcctg ggaaacattt 1080
catctggagg caggkttccc cacgtgtggg atgctccttt ttgcctcatc tgtcttcagg 1140
ggatggcagg ctcccccgca ttgcatgggg gatttttcc ccagaccagg cataatttgt 1200
ggacntgagg agtttcaatg tgttaaagat ggccctgggt naagccntat tccatctt 1258

<210> 224
<211> 584
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (494)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (495)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (577)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (583)
<223> n equals a,t,g, or c

<400> 224
cttacccaga aggcaacgct tctctttctg gtcaaaatgg ctggtaagca ggccgtttca 60
gcatcaggca agtggctgga tggtattcga aaatggtatt acaatgctgc aggattcaat 120
aaactggggt taatgcgaga tgatacaata tacgaggatg aagatgtaaa agaagccata 180
agaagacttc ctgagaacct ttataatgac aggatgtttc gcattaagag ggcactggac 240
ctgaacttga agcatcagat cttgcctaaa gagcagtgga ccaaatatga agaggaaaat 300
ttctaccttg aaccgtatct gaaagaggtt attcgggaaa gaaaagaaag agaagaatgg 360
gcaaagaagt aatcatgtag ttgaagtctg tggatgcagc tgttatgaag atggttaaac 420
ttgaaacaaa caattttaag aattatttgg tctgaagatg ttttacttta aataaatgtc 480
tattgtaatg gcwnnaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 540
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaggggnggc cgnt 584

<210> 225
<211> 3449
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3434)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3443)
<223> n equals a,t,g, or c

<400> 225
gcgagcacgt tagaaagcct gacatggcct gactcgggac agctcagagc agggcagaac 60
tggggacact ctgggccggc cttctgcctg catggacgct ctgaagccac cctgtctctg 120
gaggaaccac gagcgaggga agaaggacag ggactcgtgt ggcaggaaga actcagagcc 180
gggaagcccc cattcactag aagcactgag agatgcggcc ccctcgcagg gtctgaattt 240
cctgctgctg ttcacaaaga tgctttttat ctttaacttt ttgttttccc cacttccgac 300
cccggcgttg atctgcatcc tgacatttgg agctgccatc ttcttgtggc tgatcaccag 360
acctcaaccc gtcttacctc ttcttgacct gaacaatcag tctgtgggaa ttgagggagg 420
agcacggaag gggggtttccc agaagaacaa tgacctaaca agttgctgct tctcagatgc 480
caagactatg tatgaggttt tccaaagagg actcgctgtg tctgacaatg ggccctgctt 540
gggatataga aaaccaaacc agccctacag atggctatct tacaaacagg tgtctgatag 600
agcagagtac ctgggttcct gtctcttgca taaaggttat aaatcatcac cagaccagtt 660
tgtcggcatc tttgctcaga ataggccaga gtggatcatc tccgaattgg cttgttacac 720
gtactctatg gtagctgtac ctctgtatga caccttggga ccagaagcca tcgtacatat 780
tgtcaacaag gctgatatcg ccatggtgat ctgtgacaca ccccaaaagg cattggtgct 840
gatagggaat gtagagaaag gcttcacccc gagcctgaag gtgatcatcc ttatggaccc 900
ctttgatgat gacctgaagc aaagagggga gaagagtgga attgagatct tatccctata 960
tgatgctgag aacctaggca aagagcactt cagaaaacct gtgcctccta gcccagaaga 1020
cctgagcgtc atctgcttca ccagtgggac cacaggtgac cccaaaggag ccatgataac 1080
ccatcaaaat attgtttcaa atgctgctgc ctttctcaaa tgtgtggagc atgcttatga 1140
gcccactcct gatgatgtgg ccatatccta cctccctctg gctcatatgt ttgagaggat 1200
tgtacaggct gttgtgtaca gctgtggagc cagagttgga ttcttccaag gggatattcg 1260
gttgctggct gacgacatga agactttgaa gcccacattg tttcccgcgg tgcctcgact 1320
ccttaacagg atctacgata aggtacaaaa tgaggccaag acacccttga agaagttctt 1380
gttgaagctg gctgtttcca gtaaattcaa agagcttcaa aagggtatca tcaggcatga 1440
tagtttctgg gacaagctca tctttgcaaa gatccaggac agcctgggcg gaagggttcg 1500
tgtaattgtc actggagctg cccccatgtc cacttcagtc atgacattct tccgggcagc 1560
aatgggatgt caggtgtatg aagcttatgg tcaaacagaa tgcacaggtg gctgtacatt 1620
tacattacct ggggactgga catcaggtca cgttggggtg cccctggctt gcaattacgt 1680
gaagctggaa gatgtggctg acatgaacta ctttacagtg aataatgaag gagaggtctg 1740
catcaagggt acaaacgtgt tcaaaggata cctgaaggac cctgagaaga cacaggaagc 1800
cctggacagt gatggctggc ttcacacagg agacattggt cgctggctcc cgaatggaac 1860
tctgaagatc atcgaccgta aaaagaacat tttcaagctg gcccaaggag aatacattgc 1920
accagagaag atagaaaata tctacaacag gagtcaacca gtgttacaaa tttttgtaca 1980
cggggagagc ttacggtcat ccttagtagg agtggtggtt cctgacacag atgtacttcc 2040
ctcatttgca gccaagcttg ggtgaaggg ctcctttgag gaactgtgcc aaaaccaagt 2100
tgtaagggaa gccattttag aagacttgca gaaaattggg aaagaaagtg gccttaaaac 2160
ttttgaacag gtcaaagcca tttttcttca tccagagcca ttttccattg aaaatgggct 2220
cttgacacca acattgaaag caaagcgagg agagctttcc aaatactttc ggacccaaat 2280
tgacagcctg tatgagcaca tccaggatta ggataaggta cttaagtacn tgccggccca 2340

ctgtgcactg cttgtgagaa aatggattaa aaactattct tacatttgtt ttgcctttcc 2400
tcctattttt ttttaacctg ttaaactcta aagccatagc ttttgtttta tattgagaca 2460
tataatgtgt aaacttagtt cccaaataaa tcaatcctgt ctttcccatc ttcgatgttg 2520
ctaatattaa ggcttcaggg ctacttttat caacatgcct gtcttcaaga tcccagttta 2580
tgttctgtgt ccttcctcat gatttccaac cttaatacta ttagtaacca caagttcaag 2640
ggtcaaaggg accctctgtg ccttcttctt tgttttgtga taaacataac ttgccaacag 2700
tctctatgct tatttacatc ttctactgtt caaactaaga gatttttaaa ttctgaaaaa 2760
ctgcttacaa ttcatgtttt ctagccactc cacaaaccac taaaatttta gttttagcct 2820
atcactcatg tcaatcatat ctatgagaca aatgtctccg atgctcttct gcgtaaatta 2880
aattgtgtac tgaagggaaa agtttgatca taccaaacat ttcctaaact ctctagttag 2940
atatctgact tgggagtatt aaaaattggg tctatgacat actgtccaaa aggaatgctg 3000
ttcttaaagc attatttaca gtaggaactg gggagtaaat ctgttcccta cagtttgctg 3060
ctgagctgga agctgtgggg gaaggagttg acaggtgggc ccagtgaact tttccagtaa 3120
atgaagcaag cactgaataa aaacctcctg aactgggaac aaagatctac aggcaagcaa 3180
gatgcccaca caacaggctt attttctgtg aaggaaccaa ctgatctccc ccacccttgg 3240
attagagttc ctgctctacc ttacccacag ataacacatg ttgtttctac ttgtaaatgt 3300
aaagtcttta aaataaacta ttacagatam ttaaaaaaaa aaaaaaaaaa aaaaaaaaaa 3360
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 3420
aaaaaaaaaa aaangggggg ccnttttaa 3449

<210> 226
<211> 1866
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1859)
<223> n equals a,t,g, or c

<400> 226
caccaatgtt gataaactgg tgaaggacat ttacggagga gactatgaac gatttggcct 60
tcaaggatct gctgtagcat caagctttgg caacatgatg agtaaagaaa agcgagattc 120
catcagcaag gaagacctcg cccggccac attggtcacc atcaccaaca acattggctc 180
cattgctcgg atgtgtgcgt tgaatgagaa catagacaga gttgtgtttg ttggaaattt 240
tctcagaatc aatatggtct ccatgaagct gctggcatat gccatggatt tttggtccaa 300
aggacaactg aaagctctgt ttttggaaca tgagggttat tttggagccg ttggggcact 360
gttggaactg ttcaaaatga ctgatgayaa gtagagacga gcagtggagg aaacagcctc 420
ccaaaaggac agagaactaa aaaattgctg ctggagaagg tgaaagtcgc tttgggacgg 480
aagccaagcc attatggcag atgaacctgc tggatttgta aataatttaa aatccttcca 540
gatgatcttt tactcttagg ttttgagcta atgattcaaa acgggggaat ataaaaggtt 600
ttttttctgt atactgtatt tttttaaaaa aatggtgcag cgtggccaaa cctaccaatt 660
gtatgcatta actttgaaaa gttgtttgat gtttaagaag gacctgatat gtaagcgctg 720
gtcatttttc ttctggggtt tactgatcag tgtggtgatt ttaacttcat ttagtaatta 780
ctctaggaga ttttaccttg acttatattt ttcatgacgt ttcatgattt gctgttggtt 840
tcaaatgaaa ctacaaatct ggcatgtttt actgtgaaca cttttgttat ttgttttgta 900
cccttttttg tcttgktttt ctgktttagt tgkcttctga aaaaagagtc gttccctctg 960
tttctgtcct cagatgatgt ccctccccct acctgtaacc tttctttgac ataattgttc 1020
atatcaatga aggtgctgac cagctcaata caaagttaag cacaagatct aaagctcttg 1080
aaaatgcccg tgaagagaag actgaatgtg ttaatgaatt taatgagtct ggcaaaagtt 1140
gcaaattata tgcaagtttg tcctatcgct tataaatgta gtgtttcatt ggatttattt 1200

tatgctaggt tatattaagt tgaaatagtc tgtgattaaa tgtcctcatc catgcacaga 1260
atatgaatgg cagcaaatct ttgtgcaaga aatttgaaac ttattgggaa aagcctccca 1320
gtagattaat tgttcatatc aggagattta gggtaagtca tgggttgagg tgtcagatag 1380
taatatctat ttgttttgta catgtatata tctaggaact ttgtaacaac acatctttaa 1440
taatgttaaa ggtttttca tttttaatat tttaaactaa aaactgtact tcaatctcag 1500
tttctaaaat taaaaataat ttatactgat ctatatattt tttctttttg aaagatttca 1560
ttaagactga tgggtaactt tcaaatgagg gtcatgtaca aatattggga tgcatgagat 1620
cccatgatct tgtgtattga gcttattgtt gaaagggatt tttgaaggac agaacaatta 1680
ctccatgatg aatcttcctt tctctgcctt ctgagcaccg tctttaattt ccatatcttc 1740
aagtcttgaa gaagttgatg ttaattgaag aattcacttg tctggttgaa ataaagcctg 1800
tttctgttgt gaaaaaaaaa aaaaaaaact sgtgggggc ccggacccaa ttgccctang 1860
ggagcc 1866

<210> 227
<211> 1064
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (209)
<223> n equals a,t,g, or c

<400> 227
ggcaacagca tggccacaat tttatagcag caaaatgaag caaaaatcaa aggagttagc 60
aaaggcagaa acatatgtgt agtgtgctgc cagcataaga tggaagaact taaagaaggc 120
ctgcggcaaa gagatgagct tattgaggag aagcagcgca tgcagcagaa aatagacacc 180
atgacaaaag aggtgtttga cctccaggng acacttcttt ggaaagataa aaaaattgrg 240
aaacatggct tagttataat ccccgatggc actcccaatg gtgatgtcag tcatgaacca 300
gtggctggag ccatcactgt tgtgtctcag gaagctgctc aggtcttgga gtcagcagga 360
gaagggccat tagatgtaag gctacgaaaa cttgctggag agaaggaaga actactgtca 420
cagattagaa aactgaagct tcagttagag gaggaacgac agaaatgctc caggaatgat 480
ggcacagtgg gtgacctggc aggactgcag aatggctcag acttgcagtt catcgaaatg 540
cagagagatg ccaatagaca aattagcgaa tacaaattta agctttcaaa agcagaacag 600
gatataacta ccttggagca aagtattagc cggcttgagg gacaggttct gagatataaa 660
actgctgctg agaatgctga gaaagttgaa gatgaattga aagcagaaaa acggaagcta 720
caacgagagt tacgaacagc actggacaag attgaggaga tggagatgac caacagccac 780
ctggccaagc ggctggagaa gatgaaggcc aataggacag cacttctggc ccagcagtag 840
gaaaaccacc cttcaacctg ggtgatgctc cttgggggccc tacctagagg gactgacttt 900
tgtccattga cacaaacccc ttttagtact gttttgagtt ttgtcattaa aacagccacc 960
tttgtatttt ataatttatg acagratgaa gtcattttga atctacatga atgaacactt 1020
tggatttttg ttggagtttg attctagggt agaaccagtc catg 1064

<210> 228
<211> 373
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (329)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<400> 228
gctgcactct caggtattcc ctgctcttac tccaaaaaga tggacccagg tccgaagggg 60
cactgccact gtgggggca tggccatcct ccaggtcact gcgggccacc ccctggccat 120
ggcccagggc cctgcgggcc accccccac catggcccag ggccctgcgg gccacccccc 180
caccatggtc cagggccctg cgggccaccc cctggccatg gcccagggcc ctgcgggcca 240
cccccccacc atggtccagg gccctgcggg cctccccctg gccatggccc aggtcaccca 300
cccctggtc cacatcactg aggaagtana anaaaacagg acacaagatg gcaagcctga 360
gagaaattgc cca 373

<210> 229
<211> 2844
<212> DNA
<213> Homo sapiens

<400> 229
tcgacccacg cgtccgcagg tgttcaagat ggcggtagct gaggggttga ccgagagacc 60
cagttgamgg cctttacgaa gtgaaagagg ccgggaatcg cccctaccc gcttctcgta 120
gtcctgggag cacagcagaa gtgtttttct tttttaatg aacaagtaaa ccatacaaat 180
tgtcaacatg ggacggagat ctacatcatc caccaagagt ggaaaattta tgaaccccac 240
agaccaagcc cgaaaggaag cccggaagag agaattaaag aagaacaaaa aacagcgcat 300
gatggttcga gctgcagttt taaagatgaa ggatccaaaa cagataatcc gagacatgga 360
gaaattggat gaaatggagt ttaacccagt gcaacagcca caattaaatg agaaagtact 420
gaaagacaag cgtaaaaagc tgcgtgaaac ctttgaacgt attctacgac tctatgaaaa 480
agagaatcca gatatttaca aagaattgag aaagctagaa gtagaatatg aacagaagag 540
ggctcaactt agccaatatt ttgatgctgt caagaatgct cagcatgtgg aagtggagag 600
tattcctttg ccagatatgc cacatgctcc ttccaacatt ttgatccagg acattccact 660
tcctggtgcc cagccacccт ctatcctaaa gaaaacctca gcctatggac ctccaactcg 720
ggcagtttct atccttcctc ttcttggaca tggtgttcca cgtttgcccc ctggcagaaa 780
acctcctggc cctcccccctg gtccacctcc tcctcaagtc gtgcagatgt atggccgtaa 840
agtgggtttt gccctagatc ttccccctcg taggcgagat gaagacatgt tatatagtcc 900
tgaacttgcc cagcgaggtc atgatgatga tgtttctagc accagtgaag atgatggcta 960
tcctgaggac atggatcaag ataagcatga tgacagtact gatgacagtg acaccgacaa 1020
atcagatgga gaaagtgacg gggatgaatt tgtgcaccgt gataatggtg agagagacaa 1080
caatgaagaa aagaagtcag gtctgagtgt acggtttgca gatatgcctg gaaaatcaag 1140
gaagaaaaag aagaacatga aggaactgac tcctcttcaa gccatgatgc ttcgtatggc 1200
aggtcaagaa atccctgagg agggacggga agtagaggaa ttttcagagg acgatgatga 1260
agatgattct gatgactctg aagcagaaaa gcaatcacaa aagcagcata aagaggaatc 1320
ccattctgat ggcacatcca ctgcttcttc acagcagcag gctccgccgc agtctgttcc 1380
tccttctcag atacaagcac ctcccatgcc aggaccacca cctcttggac caccacctgc 1440
tccaccatta cggcctcctg ggccacctac aggccttcct cctggtccac ctccaggagc 1500
tcctccattc ctgagaccac ctggaatgcc aggactccga gggcccttac cccgactttt 1560
acctccagga ccaccaccag gccgaccccc tggccctccc ccaggtccac ctccaggtct 1620
gcctcctggt ccccctcctc gtggaccccc accaaggcta cctcccccctg cacctccagg 1680
tattcctcca cctcgtcctg gcatgatgcg cccacctttg gtgcctcccc ttggacctgc 1740

```
ccccctggg ctgttcccac cagctccctt gccaaaccct ggggttttaa gtgccccacc 1800
caacttgatt cagcgaccca aggcggatga tacaagtgca gccaccattg agaagaaagc 1860
cacagcaacc atcagtgcca agccacagat cactaatccc aaggcagaga ttactcgatt 1920
tgtgcccact gcactgagag tacgtcggga gaataaaggg gctactgctg ctccccaaag 1980
aaagtcagag gatgattctg ctgtgcctct tgccaaagca gcacccaaat ctggtccttc 2040
tgttcctgtc tcagtacaaa ctaaggatga tgtctatgag gctttcatga aagagatgga 2100
agggctactg tgacagcttt tgatgccaga aaaggcttct gttcacaaca gtggcccatg 2160
gagaaagagg ctcttattaa acttagatga aagagctgct tccattgtca gggtattttc 2220
taatttcagt tcaaggaata tcctaaaatt tagccttgtt cagaatttac tgcacataaa 2280
aaagggtatt tcatccagaa tagatcagtt attgaagcag tgctgctaac atccattccc 2340
tttcatacca ccattttcac cctgtttctt cccctcctcc agttctttgg aaatttgtga 2400
tcgggggatc ttagttgctt atttgttttg actcttgtgt gctgtgggca ctggagtaga 2460
gatttctgga gaaaaaaaaa cagtttattt catcttgcct tttgtgtttg agttattttt 2520
aatattttcc tgtaaatatt ttgtaatatt ttacttgtaa tgaaatggat cacaatgtca 2580
tttcctaata caaggcagga tatgtgggaa gaatatgtac aattatttga ttaaaattat 2640
ttcccactga cctaaacttt cagtgatttg tgggaaaaat aaataaatgt tctacaccaa 2700
gatactctgt gttactgata atatgtaaac ataataccta ttttatggga caggaaaaag 2760
ttaaaatatt taaaaacttg ggtttttaa gggaactgcc tttctgggta cagatgagga 2820
tcttactgga aaactgggta aaaa                                        2844
```

<210> 230
<211> 1798
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (15)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (501)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (1798)
<223> n equals a,t,g, or c

<400> 230
ngcaaatata cgtgnacact tatnaaaagt nacgcctgac acgtgaccgg ttccgggaat 60
tcccgggtcg acccacgcgt ccggcccagc actagaagtc ggcggtgttt ccattcggtg 120
atcagcactg aacacagagg actcaccatg gagtttgggc tgagctgggt tttcctcgtt 180
gctcttttaa gaggtgtcca gtgtcaggtg cagctggtgg agtctggggg aggcgtggtc 240
cagcctggga ggtccctgag actctcctgt gcagcstctg gattcacctt cagtagctat 300
ggcatgcact gggtccgcca ggctccaggc aaggggctgg agtgggtggc agttatatsr 360
tatgatggaa gtaataaata ctatgcagac tccgtgaagg gccgattcac catctccaga 420
gacaattcca agaacacgct gtatctgcaa atgaacagcc tgagagctga ggacacggct 480
gtktattact gtgcgaraga ngttactatg gttcggaaag catctactac tactttgact 540
ctggggccag ggaacmctgg tcaccgtctc ctcagcctcc accaagggcc catcggtctt 600
cccctggca ccctcctcca agagcacctc tgggggcaca gcggccctgg gctgcctggt 660
caaggactac ttccccgaac cggtgacggt gtcgtggaac tcaggcgccc tgaccagcgg 720
cgtgcacacc ttcccggctg tcctacagtc ctcaggactc tactccctca gcagcgtggt 780
gaccgtgccc tccagcagct tgggcaccca gacctacatc tgcaacgtga atcacaagcc 840
cagcaacacc aaggtggaca agaragttga gcccaaatct tgtgacaaaa ctcacacatg 900
cccaccgtgc ccagcacctg aactcctggg gggaccgtca gtcttcctct tccccccaaa 960
acccaaggac accctcatga tctcccggac ccctgaggtc acatgcgtgg tggtggacgt 1020
gagccacgaa gaccctgagg tcaagttcaa ctggtacgtg gacggcgtgg aggtgcataa 1080
tgccaagaca aagccgcggg aggagcagta caacagcacg taccgtgtgg tcagcgtcct 1140
caccgtcctg caccaggact ggctgaatgg caaggagtac aagtgcaagg tctccaacaa 1200
agccctccca gcccccatcg agaaaaccat ctccaaagcc aaagggcagc cccgagaacc 1260
acaggtgtac accctgcccc catcccggga kgagmtgacc aagaaccagg tcagcctgac 1320
ctgcctggtc aaaggcttct atcccagcga catcgccgtg gagtgggaga gcaatgggca 1380
gccggagaac aactacaaga ccacgcctcc cgtgctggac tccgacggct ccttcttcct 1440
ctayagcaag ctcaccgtgg acaagagcag gtggcagcag gggaacgtct tctcatgctc 1500
cgtgatgcat gaggctctgc acaaccacta cacgcagaag agcctctccc tgtcyccggg 1560
taaatgagtg cgacggccgg caagcccccg ctccccgggc tctcgcggtc gcacgaggat 1620
gcttggcacg taccccgtst acatacttcc crggcrccca gcatggaaat aaagcaccca 1680
scrctgccct gggcccctgc aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1740
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaawaa aaaaaaaaaa aaaaaaan 1798

<210> 231
<211> 1823
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (82)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1593)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1714)
<223> n equals a,t,g, or c

<400> 231
gtcgcctgcc acccgcttcg gccacggcca gacgcccgcg gccttcctca gcgctctgct 60
gccctcgcag ccgccgccgg gncggtcaac gccctggggc tgcccaaggg tgtcaccccc 120
gcagatttcc aaagaaggcc agtagaactg ctagaatagc ctccgatgag gaaattcaag 180
gcacaaagga tgctgttatt caagacctgg aacgaaaact tcgcttcaag gaggacctcc 240
tgaacaatgg ccagccgagg ttaacatacg aagaaagaat ggctcgtcga ctgctaggtg 300
ctgacagtgc aactgtcttt aatattcagg agccagaaga ggaaacagct aatcaggaat 360
acaaagtctc cagctgtgaa cagagactca tcagtgaaat agagtacagg ctagaaaggt 420
ctcctgtgga tgaatcaggt gatgaagttc agtatggaga tgtgcctgtg gaaaatggaa 480
tggcaccatt ctttgagatg aagctgaaac attacaagat ctttgaggga atgccagtaa 540
ctttcacatg tagagtggct ggaaatccaa agccaaagat ctattggttt aaagatggga 600
agcagatctc tccaaagagt gatcactaca ccattcaaag agatctcgat gggacctgct 660
ccctccatac cacagcctcc accctagatg atgatgggaa ttatacaatt atggctgcaa 720
accctcaggg ccgcatcagt tgtactggac ggctaatggt acaggctgtc aaccaaagag 780
gtcgaagtcc ccggtctccc tcaggccatc ctcatgtcag aaggcctcgt tctagatcaa 840
gggacagtgg agacgaaaat gaaccaattc aggagcgatt cttcagacct cacttcttgc 900
aggctcctgg agatctgact gttcaagaag gaaaactctg cagaatggac tgcaaagtca 960
gtgggttacc aaccccagat ctaagctggc aactagatgg aaagcccgta cgccctgaca 1020
gtgctcacaa gatgctggtg cgtgagaacg ggtgcactc tctgatcata gagccagtca 1080
cgtcacgtga tgccggcatc tacacatgta tagctaccaa ccgagcagga cagaactcat 1140
tcagcctgga gcttgtggtt gctgctaaag aagcacacaa accccctgtg tttattgaga 1200
agctccaaaa cacaggagtt gctgatgggt acccagtgcg gctggaatgt cgtgtattgg 1260
gagtgccacc acctcagata ttttggaaga aagaaaatga atcactcact cacagcactg 1320
accgagtgag catgcaccag gacaaccacg gctacatctg cctgctcatt cagggagcca 1380
caaaagaaga tgctgggtgg tatactgtgt cagccaagaa tgaagcaggg attgtgtcct 1440
gtactgccag gctggacgtt tacacccagt ggcatcagca gtcacagagc accaagccaa 1500
aaaaagtacg gccctcagcc agtcgctatg cagcactttc ggaccaggga ctagacatca 1560
aagcagcgtt ccaacctgag gccaacccat ctnacctgac actgaatact gccttggtag 1620
aaagtgagga cctgtaatcc agcattcttg ktaaagctga aacacttgaa acagscattg 1680
scttgaccaa catattcctt tgtcacatta tgtnaaaggc agaamcatac ctttgctatt 1740
agaaattaaa aaaacaccaa aatatatttt ctacttgaat accaacttag tttaagtaga 1800
taatgctaat acaaatatac aca 1823

<210> 232
<211> 970
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (936)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (960)

<223> n equals a,t,g, or c

<400> 232
aattcgggac gagggcagcc cgcttgccaa tcagagcgcg gctgagcggc cccgcagcca 60
acccccgagg agcggccggc tggcgtccgc cgcgcccagg agttggggat gtcctacaaa 120
cccatcgccc ctgctcccag cagcacccct ggctccagca cccctgggcc gggcaccccg 180
gtccctacag gaagcgtccc gtcgccgtcg ggctcagtgc caggagccgg cgctcctttc 240
agaccgctgt ttaacgactt tggaccgcct tccatgggct acgtgcaggc gatgaagcca 300
cccggcgccc agggctccca gagcacctac acggacctgc tgtcagtcat agaggagatg 360
ggcaaagaga tccggcctac ctatgctggc agcaagagcg ccatggagcg cytgaagaga 420
ggaagcgcct cggcctcagc gtctggacct atccggccac tgcagagcac ccgcttctcc 480
ctggccttca tcccgagttg cactaaccat cctgggcttc ctgtcctgtg tcccttggtg 540
ggtcccctcc aggaaccaag gagtggccct ccaggtggca gcactaagga caccccccca 600
caacaagagt tagcagcgag gtccccatga gtcccaccca tgacctgccg acagtgttgc 660
ccaccggaac ttttgtggcc cctaccgctc agcccttccc agcacttctc ccactttgtc 720
ccgagcctcc ttctccccca gcaggggcac aggcctggca cctccctgcc ttgtgtcctg 780
agccatagtg actcttttat ctgtgtgtct tttgctaaat atgccctttt tatattaata 840
aaagatgatt tggagttgtg ctctcaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 900
aaaaaaaggg cggccgctct agaggatcca tgcttnacgt acgcgtgcat gcgtacgtcn 960
ttgctcttct 970

<210> 233
<211> 967
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (923)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (926)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (955)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (957)
<223> n equals a,t,g, or c

<400> 233
ggcagagcac ttcctggcca ggaaacctga gcggtgagac tcccagctgc ctacatcaag 60
gccccaggac atgcagaacc ttcctctaga acccgaccca ccaccatgag gtcctgcctg 120
tggagatgca ggcacctgag ccaaggcgtc cagtggtcct tgcttctggc tgtcctggtc 180
ttctttctct tcgccttgcc ctcttttatt aaggagcctc aaacaaagcc ttccaggcat 240

caacgcacag agaacattaa agaaaggtct ctacagtccc tggcaaagcc taagtcccag 300
gcacccacaa gggcraggag gacaaccatc tatgcagagc cagygccaga gaacaatgcc 360
ctcaacacac aaacccagcc caaggcccac accaccggag acagaggaaa ggaggccaac 420
caggcaccgc cggaggagca ggacaaggtg ccccacacag cacagagggc agcatggaag 480
agcccagaaa aagagaaaac catggtgaac acactgtcac ccagagggca agatgcaggg 540
atggcctctg gcaggacaga ggcacaatca tggaagagcc aggacacaaa gacgacccaa 600
ggaaatgggg gccagaccag gaagctgacg gcctccagga cggtgtcaga gaagcaccag 660
ggcaaagcgg caaccacagc caagacgstc attyccaaaa gtcagcacag aatgctggct 720
yccacaggag cagtgtcaac aaggacgaga cagaaaggar tkaccacagc agtcatccca 780
cctaaggaga agaaacctca ggccacccca ccccctgccc ctttccagag ccccacgacg 840
cagagaaacc aaagactgaa gggcggcaac ttcaaatctg agcctcggtg ggattttgag 900
gaaaaataca agcttcgaaa tanganggct tcagacgact tggccttgac tctgngnaga 960
tcaaaag 967

<210> 234
<211> 2163
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1140)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1157)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1158)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1166)
<223> n equals a,t,g, or c

<400> 234
gcccgagcct gcgatggctc ttccccaccg gaggctcagt ccgtggctgc gtcaaaggca 60
tcaaggccct gggcaagtat gtggacctca agcggctgaa cacgacaggc gtgacgccgg 120
ctgcacygcc gacctgctgg tggggcgcgc catgactttc catggccacg gcttccttcg 180
cctggcgctc tcgaacgtgg caccgctcac tggcaacgtc tactccggct tcggcttcca 240
cagcgcccag gacagtgccc tgctctacta ccgggcgtcc ccggatgggc tatgccaggt 300
gtccctgcag cagggccgtg tgagcctaca gctcctgagg actgaagtga aaactcaagc 360
gggcttcgcc gatggtgccc cccattacgt cgccttctac agcaatgcca cgggagtctg 420
gctgtatgtc gatgaccagc tccagcagat gaagccccac cggggaccac cccccgagct 480
ccagccgcag cctgaggggc ccccgaggct cctcctggga ggcctgcctg agtctggcac 540
catttacaac ttcagtggct gcatcagcaa cgtcttcgtg cagcggctcc tgggcccaca 600
gcgcgtattt gatctgcagc agaacctggg cagcgtcaat gtgagcacgg gctgtgcacc 660

cgccctgcaa gcccagaccc cgggcctggg gcctagagga ctgcaggcca ccgcccggaa 720
ggcctcccgc cgcagccgtc agcccgcccg gcatcctgcc tgcatgctgc cccacacct 780
caggaccacc cgagactcct accagtttgg gggttccctg tccagtcacc tggagtttgt 840
gggcatcctg gcccgacata ggaactggcc cagtctctcc atgcacgtcc tcccgcgaag 900
ctcccgaggc ctcctcctct tcactgcccg tctgaggccc ggcagcccct ccctggcgct 960
cttcctgagc aatggccact tcgttgcaca gatggaaggc ctcgggactc ggctccgcgc 1020
ccagagccgc cagcgctccc ggcctggcgc tggcacaagg tctccgtgcg ctgggagaag 1080
aaccggatcc tgctggtgac ggacggggcc cgggsctgga gccaggaggg gccgcaccgn 1140
agcaccaggg ggcagannac ccccangccc cacaccctct ttgtgggcgg cctcccggcm 1200
agcagccaca gctccaaact tccggtgacc gtcgggttca gcggctgtgt gaagagactg 1260
aggctgcacg ggaggcccct gggggccccc acacggatgg caggggtcac accctgcatc 1320
ttgggccccc tggaggcggg cctgttcttc ccaggcagcg gggagttat cactttagac 1380
ctcccaggag ctacactgcc tgatgtgggc ctggaactgg aggtgcggcc cctggcagtc 1440
accggactga tcttccactt gggccaggcc cggacgcccc cctacttgca gttgcaggtg 1500
accgagaagc aagtcctgct gcgggcggat gacggagcag gggagttctc cacgtcataa 1560
cccgcccctc agtgctgtgt gatggccagt ggcaccggct agcggtgatg aaaagcggga 1620
atgtgctccg gctggaggtg gacgcgcaga gcaaccacac cgtgggcccc ttgctggcgg 1680
ctgcagctgg tgccccagcc cctctgtacc tcgggggcct gcctgagccc atggccgtgc 1740
agccctggcc ccccgcctac tgcggctgca tgaggaggct ggcggtgaac cggtcccccg 1800
tcgccatgac tcgctctgtg gaggtccacg gggcagtggg ggccagtggc tgcccagccg 1860
cctaggacac agccaacccc ggcccctggt caggcccctg cagctgcctc acaccgcccc 1920
ttgtgctcgc ctcataggtg tctatttgga ctctaagctc tacgggtgac agatcttgtt 1980
tctgaagatg gtttaagtta tagcttctta aacgaaagaa taaaatactg caaaatgttt 2040
ttatatttgg cccttccacc catttttaat tgtgagagat ttgtcaccaa tcatcactgg 2100
ttcctcctta aaaattaaaa agtaacttct gtgtaaaaaa aaaaaaaaaa aaaaaaaaaa 2160
aaa 2163

<210> 235
<211> 1321
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1313)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1320)
<223> n equals a,t,g, or c

<400> 235
gcgcgacgcc gccacctccg gaacaagcca tggtggcggc gacggtggca gcggcgtggc 60
tgctcctgtg ggctgcggcc tgcgcgcagc aggagcagga cttctacgac ttcaaggcgg 120
tcaacatccg ggcaaactg gtgtcgctgg agaagtaccg cggatcggtg tccctggtgg 180
tgaatgtggc cagcgagtgc ggcttcacag accagcacta ccgagccctg cagcagctgc 240
agcgagacct gggcccccac cacttcaacg tgctcgcctt cccctgcaac cagtttggcc 300
aacaggagcc tgacagcaac aaggagattg agagctttgc ccgccgcacc tacagtgtct 360
cattccccat gtttagcaag attgcagtca ccggtactgg tgcccatcct gccttcaagt 420
acctggccca gacttctggg aaggagccca cctggaactt ctggaagtac ctagtagccc 480

cagatggaaa ggtggtaggg gcttgggacc caactgtgtc agtggaggag gtcagacccc 540
agatcacagc gctcgtgagg aagctcatcc tactgaagcg agaagactta taaccaccgc 600
gtctcctcct ccaccacctc atcccgccca cctgtgtggg gctgaccaat gcaaactcaa 660
atggtgcttc aaagggagag acccactgac tctccttcct ttactcttat gccattggtc 720
ccatcattct tgtgggggaa aaattctagt attttgatta tttgaatctt acagcaacaa 780
ataggaactc ctggccaatg agagctcttg accagtgaat caccagccga tacgaacgtc 840
ttgccaacaa aaatgtgtgg caaatagaag tatatcaagc aataatctcc cacccaaggc 900
ttctgtaaac tgggaccaat gattacctca tagggctgtt gtgaggatta ggatgaaata 960
cctgtgaaag tgcctaggca gtgccagcca aataggaggc attcaatgaa catttttgc 1020
atataaamca aaaaataact tgttatcaat aaaaacttgc atccaacatg aatttccagc 1080
cgatgataat ccaggccaaa ggtttagttg ttgttatttc ctctgtatta ttttcttcat 1140
tacaaaagaa atgcaagttc attgtaacaa tccaaacaat acctcacgat ataaaataaa 1200
aatgaaagta tcctcctcaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1260
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aangggggn 1320
c 1321

<210> 236
<211> 683
<212> DNA
<213> Homo sapiens

<400> 236
tcgacccacg cgtccgagca gctgctgcag ggcccatggc ggacacccag tacatcctgc 60
ccaatgacat cggcgtgtct agcctggact gccgtgaggc cttccgcctg ctgtcaccca 120
cagagcgcct ctatgcctac cacctgtccc gtgccgcctg gtacggaggc ctggctgtgc 180
tgcttcagac ctcccctgag gccccctaca tctatgctct gctcagccgc ctcttccgcg 240
cccaggaccc cgaccagctg cgccaacatg ccctggctga aggccttacc gaggaggagt 300
atcaggcgtt cctggtctat gccgcgggtg tttactccaa catgggcaac tacaagtcct 360
ttggtgacac caagtttgtt cccaacttgc ccaaggaaaa gctggaacgg gtgatcctag 420
ggagtgaggc tgctcagcag cacccagaag aagtcagggg cctctggcak acctgcgggg 480
agcttatgtt ctctctggag ccaaggcttc gacacctcgg actggggaag gagggaatca 540
ccacctattt ctctgggaat tgtaccatgg aagatgccaa attggccmag atttctggac 600
tcacagaacc tyartgccta caacaaccgg stcttyaaag aagtcsatgg garaaaggaa 660
rccctamtac gaaggtgcgg gtt 683

<210> 237
<211> 2115
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2112)
<223> n equals a,t,g, or c

<400> 237
attcccgggt cgacccacgc gtccgggctc cggcaaccgc tccggcaacg ccaaccgctc 60
cgctgcgcgc aggctgggct gcaggctctc ggctgcagcg ctggggtctt gctttgtctc 120
ccaggctggt gtgcagtggt gcgaccacgg ctcacggcag cctcagccac ccagatgtaa 180
gcgatctggt tcccacctca gcctcccgag tagtggatct aggatccggc ttccaacatg 240
tggcagctct gggcctccct ctgctgcctg ctggtgttgg ccaatgcccg gagcaggccc 300

tctttccatc ccstgtcgga tgagctggtc aactatgtca acaaacggaa taccacgtgg 360
caggccgggc acaacttcta caacgtggac atgagctact tgaagaggct atgtggtacc 420
ttcctgggtg ggcccaagcc accccagaga gttatgttta ccgaggacct gaagctgcct 480
gcaagcttcg atgcacggga acaatggcca cagtgtccca ccatcaaaga gatcagagac 540
cagggctcct gtggctcctg ctgggccttc ggggctgtgg aagccatctc tgaccggatc 600
tgcatccaca ccaatgcgca cgtcagcgtg gaggtgtcgg cggaggacct gctcacmtgc 660
tgtggcagca tgtgtgggga cggctgtaat ggtggctatc ctgctgaagc ttggaacttc 720
tggacaagaa aaggcctggt ttctggtggc ctctatgaat cccatgtagg gtgcagaccg 780
tactccatcc ctccctgtga gcaccacgtc aacggctccc ggcccccatg cacgggggag 840
ggagataccc ccaagtgtag caagatctgt gagcctggct acagcccgac ctacaaacag 900
gacaagcact acggatacaa ttcctacagc gtctccaata gcgagaagga catcatggcc 960
gagatctaca aaaacggccc cgtggaggga gctttctctg tgtattcgga cttcctgctc 1020
tacaagtcag gagtgtacca acacgtcacc ggagagatga tgggtggcca tgccatccgc 1080
atcctgggct ggggagtgga gaatggcaca ccctactggc tggttgccaa ctcctggaac 1140
actgactggg gtgacaatgg cttctttaaa atactcagag gacaggatca ctgtggaatc 1200
gaatcagaag tggtggctgg aattccacgc accgatcagt actgggaaaa gatctaatct 1260
gccgtgggcc tgtcgtgcca gtcctggggg cgagatcggg gtagaaatgc atttt attct 1320
ttaagttcac gtaagataca agtttcagrc agggtctgaa ggactggatt ggccaaacat 1380
cagacctgtc ttccaaggag accaagtcct ggctacatcc cagcctgtgg ttacagtgca 1440
gacaggccat gtgagccacc gctgccagca cagagcgtcc ttccccctgt agactagtgc 1500
cgtagggagt acctgctgcc ccagctgact gtggccccct ccgtgatcca tccatctcca 1560
gggagcaaga cagagacgca ggaatggaaa gcggagttcc taacaggatg aaagttcccc 1620
catcagttcc cccagtacct ccaagcaagt agctttccac atttgtcaca gaaatcagag 1680
gagagatggt gttgggagcc ctttggagaa cgccagtctc ccaggccccc tgcatctatc 1740
gagtttgcaa tgtcacaacc tctctgatct tgtgctcagc atgattcttt aatagaagtt 1800
ttattttttc gtgcactctg ctaatcatgt gggtgagcca gtggaacagc gggagacctg 1860
tgctagtttt acagattgcc tcctaatgac gcggctcaaa aggaaaccaa gtggtcagga 1920
gttgtttctg acccactgat ctctactacc acaaggaaaa tagtttagga gaaaccagct 1980
tttactgttt ttgaaaaatt acagcttcac cctgtcaagt taacaaggaa tgcctgtgcc 2040
aataaaaggt ttctccaact tgaaaaaaaa aaaaaaaaaa aaamwmgggg ggggcccgta 2100
cccattggcc tntgg 2115

<210> 238
<211> 1642
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1633)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1638)
<223> n equals a,t,g, or c

<400> 238
taagcaggca ctagaggacc tggagcgcac atcaggccgt ggcaccctga tgtcgccacc 60
atgctcaaca tccttgcttt ggtgtatcgt gaccagaata agtataagga agctgcccac 120
ctgctgaatg atgcccttag catccgggag agcaccttgg gacctgacca tcctgctgtg 180

gctgccacac tcaacaattt ggctgtgctc tatggcaaaa ggggcaagta caaggaggca 240
gagcctctgt gccagcgggc actggagatt cgagaaaagg tcctgggcac gaatcatcca 300
gatgtggcaa aacagctgaa caacctggcc ctcttgtgcc aaaaccaggg caagtatgag 360
gccgtggaac gctactacca gcgagcactg gccatctacg aggggcagct ggggccggac 420
aaccctaatg tagcccggac caagaacaac ctggcttcct gttacctgaa acagggcaaa 480
tatgctgagg ctgagacact atacaaagag atcctgaccc gtgcccatgt acaggagttt 540
gggtctgtgg atgatgacca caagcccatc tggatgcatg cagaggagcg ggaggaaatg 600
agcaaaagcc ggcaccatga gggtgggaca ccctatgctg agtatggagg ctggtacaag 660
gcctgcaaag tgagcagccc cacagtgaac actactctga gaaacctggg agctctgtat 720
aggcgccagg gaaagctgga ggctgctgag accctggagg aatgtgccct gcggtcccgg 780
agacagggca ctgaccctat cagccagacg aaggtggcag agctgcttgg ggagagtgat 840
ggtagaagga cctcccagga gggccctgga gacagtgtga aattcgaggg aggtgaagat 900
gcttctgtgg ctgtggagtg gtccggggat ggcagtggga ccctgcagag gagtggctct 960
cttggcaaga tccgggatgt gctccgcaga agcagtgaac tcttggtgag gaagctccar 1020
gggactgagc ctcggccctc cagcagcaac atgaagcgag cagcctcctt gaactatctg 1080
aaccaaccta gtgcagcacc cctccaggtc tcccggggcc tcagtgccag caccatggac 1140
ctctcttcaa gcagctgaca ttcaacccgg cccccaggtc tgctgggtcc ccccaccccc 1200
acagccctca cagcattccc cattgctcct ggctcttccc caccccctagg tgggacagtg 1260
aaggggagca gtttaaccag aagattgctg ctgcccttag ggtctcagct ccctcctcag 1320
gaatccctct taggaaggac cctcaggaca ccctctctgc accctgtggt cctctagagt 1380
agctagctct gaggccccaa ggtgggtaca aagcaggtat ggccctcaga gatgcagcct 1440
gctgctggct tttcagtcag agggttgggg gctggccagc caagctgcct tgccctggcc 1500
gctcttactc cctccctctg ctgtctcact tcaggtccat gtatttcact tttcttaaat 1560
aaaagaatca ggtaacctta aaaaaaaaa aaaaaaaaa cttggggggg gccccgaacc 1620
caatttgccc canagggngg cg 1642

<210> 239
<211> 468
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (461)
<223> n equals a,t,g, or c

<400> 239
gcggacgcgt gggcctggtc tcagtatggc gctgtcctgg gttcttacag tcctgagcct 60
cctacctctg ctggaagcca gatcccattg tgtgccaacc tagtaccggt gcccatcacc 120
aacgccaccc tggaccggat cactggcaag tggttttata tcgcatcggc ctttcgaaac 180
gaggagtaca ataagtcggt tcaggagatc caagcaacct tcttttactt tacccccaac 240
aagacagagg acacgatctt tctcagagag taccagaccc gccagaacca gtgcttctat 300
aactccagtt acctgaatgt ccagcgggag aatgggaccg tctccagata cgagggaggc 360
cgagaaacat gttgctcacc tgctgttcct tagggacacc aagaccttga tgtttggtty 420
ctacctggac gatgagaaga actgggggtg tctttctatg ntgacaag 468

<210> 240
<211> 1329
<212> DNA
<213> Homo sapiens

<400> 240
tacatcttat aaaacctaac tggcatttaa aaaatactgt ggccgggcgt ggtggctcat 60
gcctgtaatc ccagcacttt gggaggccga ggtgggagga ttgcttgagt ccaggaattt 120
gagaccagcc tggacaacac agtgagacct catctctatc aaaaaataaa aattagctag 180
atgtggtggc atgagcctgt gttcccagct gcttaggagg ctgaagcagg aggattgatt 240
gagcctgcga ggccaaggct gcagcaggct gtgattgcac cactgcactt cagcttgggc 300
aacagagcaa gaccctgtct ccgaaacaaa taaaaaatac tgtaataaaa gtacttataa 360
acatactaat cctctttcag gaccctaaag ttgcaggtta gtaggtcttc aaggacaaat 420
ctgtaagttt cttatttctg tagtgcaagt aaaatttcac tttttgaaac tatagagaga 480
tccctttctg attagcctac agaacttaaa gtgagggaac catttcctct cacagacaaa 540
gaggcctggg atattaggac tttggggttt gagagcatca tggggcagac agatggtgga 600
tggtctggac aagaagcgag taagccactg cggttggtca tactgaaggg aattgatggc 660
aagaggatcc cctgagcaag tcagaagtta ctctcatcag tcgttcatgg tcacaacctg 720
aggtactctg ctgagtgggc aaggctgaag aagaggcctg tggaatgcag cattacctgc 780
tggacagagc agggcaggca gttctatgcc ttggagctcc tgactgcagg gactctgtcc 840
ccacactcar aaagactcag ctcactcaat gagagaatgt gatttacttt atagaacgta 900
taatcaactt tgttgaataa tttgttctat taaggctgtc taaagtatgt gatgtcttca 960
tcatagtatg aagtgttgaa aattaataac gagcctagtt taggaaaaag ctgcttaaaa 1020
ctgtggctct aagagagtaa tcataaaata ccttagataa aattgcacta tggaatttc 1080
attgagtatg tttaaattat tggcttgtct actaatacac atctgcttca aaatgaacat 1140
atttcataaa attggcatca attttaatga cgctcctggt atggaacctc agatataccc 1200
tattggagac aatcctttga tcataaattc tccccaacta taaatcattt tatgtcttta 1260
tcawaaaaaa aaaaaggaat tcgatatcaa gcttatcgat accgtcgacc tcgagggggg 1320
gcccgtacc 1329

<210> 241
<211> 1652
<212> DNA
<213> Homo sapiens

<400> 241
gagcayttcg gcaactggca aaaattaggt gtacagggat ctaggtaata ctgtttattt 60
gagcaataat atattgtgct aacgttcagg catcctatta ctgagaaata agggaaaatg 120
agtgtaaagt acaactaaga gtctcggcta cagggaaaaa taccatcagt taaatatcca 180
tagtcctaga gcatttatgt aaaactgcaa tttgaatcct gcaatacatt ttggcttttt 240
cctcagtgat accatgtgtg ggaagttgtt ctgtcaaggt gggtcggata atttgccctg 300
gaaaggacgg atagtgactt tcctgacatg taraacattt gatcctgaag acacaagtca 360
agaaatargc atggtggcca atggaactaa gtgtggcgat aacaaggttt gcatkaatgc 420
agaatgtgtg gatattgaga aagcctacaa atcaaccaat tgctcatcta agtgcaaagg 480
acatgctgtg tgtgaccatg agctccagtg tcaatgtgag gaaggatgga tccctcccga 540
ctgcgatgay tcctcagtgg tcttccactt ctccattgtg gttggggtgc tgttcccaat 600
ggcggtcatt tttgtggtgg ttgctatggt aatccggcac cagagctcca gagaaaagca 660
gaagaaagat cagaggccay tatctaccac tggcaccagg ccacacaaac agaagaggaa 720
accccagatg gtaaaggctg ttcaacccca agagatgagt cagatgaagc cccatgtgta 780
tgatctgcca gtagaaggca atgagccccc agcctctttt cataaagaca caaacgcact 840
tccccctact gttttcaagg ataatccaat gtctacacct aaggactcaa atccaaaagc 900
atgaagcaac agctaagcaa gaactaatgg ctaaattatc aacttggaaa actggaaaat 960
ctggatggca gagaaatata ctatctcacc agtatttgct ctcgactcaa gaaggttaac 1020
attttctgat tcatgttaga ctttgaagag actaaagaaa attttcaaga ggaacatatg 1080
cctgagaacc tttgcatgaa tttaaaattt caattatcca ttcttataag aaggaagatg 1140
attgtaaaga aatatctccg aagttaaaat ctgtaatagg aattgattca ttctctaatg 1200

aaaacaaaac ataaaaacat cacactaatc ttggaggaat aagaaaaatt gtacatccat 1260
taaatgtaca attgattgca acatcttgat tgttttaacc attaacttgt caaattacaa 1320
tcacagttaa gaaaatgatg taaaattctg ttttgtggat ctctttccta gattagcttc 1380
tgaaatcatt attagctata tcatttgagg ttttctacaa tttggtataa ctaagaattt 1440
aaaaatgttt tatcatatat atttgtataa ttaattactg gcatggttaa agtggttttc 1500
actttttaaa tggagaaaat ttcagttaaa ttaataggat aaaccaggtt gcgaactggt 1560
gacctgtagg ccatgtttgc actgcaaata tatttggtct gaatgatatt gaaaaaaaaa 1620
aaaaaaaaaa ctcgaggggg ggcccgtacc ca 1652

<210> 242
<211> 1946
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (84)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (538)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1932)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (1941)
<223> n equals a,t,g, or c

<400> 242
ggcacgagta caaggtggcg gcgctgggmc tggccaccgg cwtcgtcttg gtgctgctgc 60
tgctctgcct ctaccgcgtg ctangcccgc gcaactacgg gcagctgggt ggtgggcccg 120
ggcggcggag gcgcggggag ctgccctgcg acgactacgg ctatgcgcca cccgagacgg 180
agatcgtgcc gcttgtgctg cgcggccacc tcatggacat cgagtgcctg gccagcgacg 240
gcatgctgct ggtgagctgc tgcctggcag gccacatctg cgtgtgggac gcgcagaccg 300
gggattgcct aacgcgcatt ccgcgcccag gcaggcagcg ccgggacagt ggcgtgggca 360
gcgggcttga ggctcaggag agctgggaac gactttcaga tggtgggaag gctggtccag 420
aggagcctgg ggacagccct cccctgagac accgcccccg gggccctccg ccgccttccc 480
tcttcgggga ccagcctgac ctcacctgct taattgacac caacttttca gcgcagcntc 540
ggtcctcaca gcccactcag cccgagcccc ggcaccgggc ggtctgtggc cgctctcggg 600
actccccagg ctatgacttc agctgcctgg tgcagcgggt gtaccaggag gaggggctgg 660
cggccgtctg cacaccagcc ctgcgcccac cctcgcctgg gccggtgctg tcccaggccc 720
ctgaggacga gggtggctcc cccgagaaag gctccccttc cctcgcctgg gcccccagtg 780
ccgagggttc catctggagc ttggagctgc agggcaacct catcgtggtg gggcggagca 840
gcggccggct ggaggtgtgg gacgccattg aaggggtgct gtgctgcagc agcgaggagg 900
tctcctcagg cattaccgct ctggtgttct tggacaaaag gattgtggct gcacggctca 960

acggttccct tgatttcttc tccttggaga cccacactgc cctcagcccc ctgcagttta 1020
gagggacccc agggcggggc agttcccctg cctctccagt gtacagcagc agcgacacag 1080
tggcctgtca cctgacccac acagtgccct gtgcacacca aaaacccatc acagccctga 1140
aagccgctgc tgggcgcttg gtgactggga gccaagacca cacactgaga gtgttccgtc 1200
tggaggactc gtgctgcctc ttcacccttc agggccactc aggggccatc acgaccgtgt 1260
acattgacca gaccatggtg ctggccagtg gaggacaaga tggggccatc tgcctgtggg 1320
atgtactgac tggcagccgg gtcagccatg tgtttgctca ccgtggggat gtcacctccc 1380
ttacctgtac cacctcctgt gtcatcagca gtggcctgga tgacctcatc agcatctggg 1440
accgcagcac aggcatcaag ttctactcca ttcagcagga cctgggctgt ggtgcaagct 1500
tgggtgtcat ctcagacaac ctgctggtga ctggcggcca gggctgtgtc tcctttttggg 1560
acctaaacta cggggacctg ttacagacag tctacctggg gaagaacagt gaggcccagc 1620
ctgcccgcca gatcctggtg ctggacaacg ctgccattgt ctgcaacttt ggcagtgagc 1680
tcagcctggt gtatgtgccc tctgtgctgg agaagctgga ctgagcgcag ggcctccttg 1740
cccaggcagg aggctggggt gctgtgtggg ggccaatgca ctgaacctgg acttggggga 1800
aagagccgag tatcttccag ccgctgcctc ctgactgtaa taatattaaa ctttttttaaa 1860
aaaccataaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 1920
aaaaaaaaaa anaaaaaaaa nggggg 1946

<210> 243
<211> 518
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (298)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (472)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (494)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (500)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (507)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (513)

<223> n equals a,t,g, or c

<400> 243
ggacgcgtgg gcagctgcag aaatccaaaa atattgacct tataagctca agatgctgta 60
tgctgggttt ttacaaggat attcggtatt tgatgaaacc cagttaggca tgacatattc 120
cccttctccc cattcctacc tctcttttat taaaaatttt atagttacag tgtctatgtt 180
gcccagcctg gtcttgaacc ctttggctca agtgatccac ctgccttggc ctcccaaagt 240
gctgggatta cagatgggag ccatcgtgtc tggcccattc ctgcctctta aagccctnca 300
cccaacaggc agacttgaga ctcaaaccgt ggtcccagct cttgcatcag gggtagtttg 360
ggaattcaaa atctttcaaa ctggggtaaa aaccaggccc agaattcaga gttcaaccaa 420
caagctttcc aagaatgccg gcccaaagga aaaaagtggg ttcttggaaa anccggggaa 480
aaggggggtg caanccttttn gggagtnaca agngcttg 518

<210> 244
<211> 621
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (460)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (569)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (593)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (609)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (612)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (621)
<223> n equals a,t,g, or c

<400> 244
gggaaggtcc atgggttgat acctcaggtc aaaaatgtgt ttactctgtt gattgctgtt 60
tcactttact tgtatatcag atatataagc tatgaacaca agtttgtagt aaaagtatct 120

tctgtctggg caatggctca cacctgtaat tccaacactt tggggggctc aggtgggagg 180
atttctagtc cccaggagtt tgagaccagc ctgggcaata aactagaccc catgtctcta 240
aaaaatgtaa aaaacatcaa gaggctgagt caggaggatc atttgagctt aggagttcaa 300
ggctgcagta agttatgatt gtgccactgc attccagcct gggtgacaag agtgagaccc 360
tgacccaaaa aaagtatctt ctgataaagt ggcatttgaa aattgcagaa aattttaata 420
ttttttcttt taatattaag aactttattg atctctctan gacaccttgg tgaggaaatt 480
aatggcactt ttcttgacat tcaacctggg actttgggtg attctgggtt ctggtgaatt 540
taaagtttca acatttcttt ggggcaccnt ttacaagggg tttggccctt ggnaccttat 600
gaccggtcna anggtccaaa n 621

<210> 245
<211> 480
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (340)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (431)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (447)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (458)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (460)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<400> 245

ggcacgaggt gaaaccctgt ctctactaaa aatacaaaaa ttagctgggt gtggtggtgg 60
gcgcctgtag tcccagctac tcgggaggct gaggcgggag tatgacttga acctgggagg 120
cggaggttgc agtgagctga gattgtgcca ctgcactcca gcctgggtga cagagcaaga 180
ctccgtttca gaaaaaaaaa aaaactgtgt ctcatcattg cactgttctt ttaaaattgt 240
atatatatat ttttcttgca gatacactct ggaaatgatt aaactagtac cacataatga 300
aagtgcatgg aactatttga aagggatttt gcaggatcgn ggtctttcca aatatcccaa 360
tctgtnaaat caattacctt gatttacaac caagtcaaag ttccccctac ctaattgcct 420
ttcttgggga naccatgaag acatgcnaga aaaccagngn gacaataang gagacatcct 480

<210> 246
<211> 451
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (102)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (107)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (135)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (198)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (287)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (309)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (314)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (319)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (328)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (342)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (379)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (434)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (438)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (439)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (451)
<223> n equals a,t,g, or c

<400> 246
aggcgaccca ccaccatgcc ccggctaaat ttagttgtat ttttagtaga gatggggttt 60
caccgtatta gccaggatgg tctcgatctc ctgacctcgt gntccgngcn cctcggcctc 120
ccaaagtgct ggganttaca ggcgtgagcc accgtgcccg gcctgattct cttaaaattg 180
aagaggtgct gccaaggnct tcagatctaa cgcagatgca tagaccttgt tcatggtact 240
tgttcagcct gtgctgggga gccgtggttc cgagtttcct gggaggntga cagggtgaag 300
ccaccgtanc cacnacccnc cganttcncn tncgctttct tntcagcant aggattaaag 360
ggattttgaa tgaagcaant tttaaggggt aggaggtgtt ggggaaaata aataattatt 420
caagtaaggc cttngggnnt ttagggggtt n 451

<210> 247
<211> 530
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (404)
<223> n equals a,t,g, or c

<400> 247
aggaaannag tanctgacag taacggtcng aattcccggn tcgacccacg cgtccgctgg 60
aacttctcct ggtctctcag ctggggccac tgtcggcatc atgattggag tgctggttgg 120
ggttgctctg atatagcagc cctggtgtag tttcttcatt tcaggaagac tgacagttgt 180
tttgcttctt ccttaaagca tttgcaacag ctacagtcta aaattgcttc tttaccaagg 240
atatttacag aaaagactct gaccagagat cgagaccatc ctagccaaca tcgtgaaacc 300
ccatctctac taaaaataca aaaatgagct gggcttggtg gcgcacacct gtagtcccag 360
ttactcgggg aagctgaggc aggagaatcg cttgaacccg ggantggaga ttgcagtgag 420
cccagatcgc accactgcac tccagtctgg ccaacagagc aagactccat ctcaaaaaag 480
aaaagaaaag gagactctga cctggtactc ttgaatacaa gtttctgata 530

<210> 248
<211> 635
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (217)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (224)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (235)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (408)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (513)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (516)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (560)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (568)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (576)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (603)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (635)
<223> n equals a,t,g, or c

<400> 248
ggtggcaggt gcttataatc ccagctactc tgggggccaa ggcaggagaa ttgcttgagc 60
ctgggagatg gaggttgcag tgagctgaga tcatgccact gcactccagc ctgggcaaca 120
gagcaagact ctgcctcaaa aaaaaattaa aataaattta aatacaaaaa aaaatagcca 180
ggtgtggggt gcatgcctgg aatcccagct acttganaag gctnaaggca ccaanaattg 240
cttgaaccca ggaggtggag gttgcagtga gccaagatca caggagccac tgcactccag 300
cctgggtgac agagtgagac tctgtctcaa aaaaaaaatt aaataaatta ttataacctt 360
tcaaaaatgc tgtgtgcatt ttcatgttct tttttttaac attactgnca ctctccctaa 420
tgaaatggac ttcaaanaag cagtattttg ttaaataaat acataacctc attctgaata 480
atgnccctca ttttgactat aactgggctt ggnttnaaaa gcaaaattta acaaaaattt 540
aatccccttc caaaggaacn ttgggtancc tgggtnaaaa aatgccaaat ggggtacttt 600
tanttaaaat ttggaattta acatcttttt tggan 635

<210> 249
<211> 360

<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (118)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (280)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (282)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (305)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (360)
<223> n equals a,t,g, or c

<400> 249
ctcaggaaac catgtccaaa accctagcag cggtacagca tgctgtctcc aacccttatc 60
cccaggttta agggtggttt atggccatac gtggaggttt tttgttgttg ttttttganac 120
tgagtttcac tcttgttgcc caggctggag tgcaatggca ccatctcggc tcactgcaac 180
ctccacctcc tggttcaagc gatctcaggc ctcagcttcc caagtagttg ggattacagg 240
cgcctgccac cacacctggc taattttgta tttttagtan anatggggtt ctccatgttg 300
gtcangctgg tctcaaactc ccgaactcaa gtgatctgcc cgccttgggc tcccaaaatn 360

<210> 250
<211> 464
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (436)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (459)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (460)
<223> n equals a,t,g, or c

<400> 250
gctgtgagga aggggaatcg cttgaacccg ggaggcggag gttgcggtga gccgagatag 60
cgccattgca ctccagcctg ggcaacaaga gcgaaaccct gtctcaaaaa aaaaacaaaa 120
aaccccacaa aaactaggag cctggaaggc cggactgggt ctccgtggga ggggcctggg 180
tctggagagc agggcagggt ctcctgggcc taggggatgg ggatggggct gggtctcaga 240
ggaggcaggg tttacgtgca gaagagcgga cttggtctcc ggggtcccga gtgggtgacg 300
cggcccgcca caggtgcttc ctgaaggtga gccggctgga ggcacaactg ctcctggagc 360
gctaccccga gtgcgggaac ctgctgctgc ggcccancgg ggacggcgcc gacggcgtgt 420
cggtcaccac tcggcngatg ccaacnggaa cgcacgtgnn ccgg 464

<210> 251
<211> 315
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (37)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (77)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (113)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (202)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (210)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (220)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (265)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (302)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (305)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (311)
<223> n equals a,t,g, or c

<400> 251
aaagtaaaca tcggggaagg tttncggnaa cgctccnagg taccggtccg gaattcccgg 60
gtcgacccac gcgtttngct ccttgttcag gctggtctgg aactggcgac ttngggtgat 120
ccgcccgcct cggcctccca aagtggtggg attacaggtg tgagccaccg tgcccagccc 180
tgaaatagtc ttaattgctt gnttttcttn tttgtctgan gtgtgctttt taaaatctct 240
atggagatgg agaagactga cattntctgg cctgatgtga aaaacctctc attaaaaacc 300
gngtntgtag ntttg 315

<210> 252
<211> 333
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (79)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (196)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (200)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (254)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (302)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (303)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<400> 252
gggctaattt gtgtattttt agtggaaacg gggttttgcc acgttggcca ngctggtctc 60
gaactcctga cctcaggtna tccacccacc ccagcctccc aaagtgctgg gattacaggc 120
gtgagccact gagcccagcc nacttttcag tttttaacat aatttttgtt ttatccacaa 180
cttttcaagt attganagtn caataaaaaa catgggttct tagtctgtaa ctntctgtta 240
aagcctatga atnncttctg aaaatcatgt ttttaaatgc ataaaatata tacgattacg 300
anngaatctt attattgtcg aaatncagtt att 333

<210> 253
<211> 307
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (250)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (260)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (281)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (299)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (302)
<223> n equals a,t,g, or c

<400> 253
gaaaaanttt taaaggaaga agggaaggca ggctggggag gntggggnaa ggaagcaggg 60
agtgcagatc actccccttc catgagttgt tttcttaaga tgctagaact tggccaggca 120
tggtggctca cccctgtaat cccagcactt tgggaggctg aggctggcag atcacttgag 180
gtcaggagtt ccagaccagc ctggccaaca tggtgaaacc ccatctctac taataataca 240
aaatttagcn gggtgtgggn ggtgtgcacc tgtggcccta nctacttggg aaggctgana 300
cnaggag 307

<210> 254
<211> 401
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (256)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (340)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (359)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (379)
<223> n equals a,t,g, or c

<400> 254

gtataaatgt tacttaaaaa aaatatattt ggccgagcac agtggctcac gcctgtaatc 60
cccacacttt gggaggccga ggcgggcaga ttgcctgagg tcaggaattt gagatcagcc 120
tggccaacat gatgaaaccc cgtctctact aaaaatacaa aaattagccg ggcatggtgg 180
caggcacctg taatcccggc tactcgggag gctgaggcag gaaaatcgct tgaacccggg 240
agtcggaagt tgcagngagc caaggtcatg tcatcattgc actccagctt gggcaacaag 300
agtgaagact tcgtctcaaa aaaaaaactt acagactttn ttttcctttn gtaaattgnt 360
agtttaactt tgaattcnng atgaaggatt tattcttatc t 401

<210> 255
<211> 406
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (149)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (243)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (369)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (370)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (392)
<223> n equals a,t,g, or c

<400> 255
gcttatcatt tgtattaaaa tatggtttaa tgtaaagagt tgcctttctc cattcccccc 60
tcccctcccc tcccctcctc tcccctcctc tcttaccccc aattaaaaaa tagcacatcc 120

ctaatgtggg aaacagtaag aaagcatana ttacatttta ggcagggcac agtggctcac 180
gcctgtaatc ccagcacttt cggaggctga ggtgggtgga tcacttgagg tcaggagttt 240
ganaccagcc tggccaacat ggtgaaaccc tgtctctact aaaagtacaa aaattagcca 300
ggcatggagg cgggtgcctg taatcccagc tacttgggag gctgaggcag gagaattgct 360
tgagcccann aggcanaggt tgcagtgagn anagatcggg ccattg 406

<210> 256
<211> 415
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (27)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (379)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (411)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (412)
<223> n equals a,t,g, or c

<400> 256
gacatgaatt ccttaatgat gggagangat aaaatcaagt tcaaacacat cacccccctg 60
caggagcaga gcaaagaggt ggccatccgc atctttcagg gctgccagtt tcgctccgtg 120
gaggctgtgc aggagatcac agagtatgcc aaaagcattc ctggttttgt aaatcttgac 180
ttgaacgacc aagtaactct cctcaaatat ggagtccacg agatcattta cacaatgctg 240
gcctccttga tgaataaaga tggggttctc atatccgagg ggccaagctt catgacaagg 300
gagtttctaa agagcctgcg aaanctttg gtgactttat gggagcccag tttgagtttg 360
ccgtgaaatt ccatggcnng ggattatatg gacagcggct tgggcaaatt nnagc 415

<210> 257

<211> 414
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (102)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (375)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (380)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (411)
<223> n equals a,t,g, or c

<400> 257
cgcagaggaa accccgcacc cctggcagaa gttccggacc aagccccagg gggaccagga 60
caccggcaag gaggctgatg acggatgtgc ccttgggggc angtgatggg agcacagctg 120
gaacaatgtg ctcggccccc agtgctctgt gggagcccca ggacaagtga gctggtgtca 180
cctcctgcct gggggaagag ccaggccctg aagaacagcc gcagcgtgtc acaggtgttg 240
gtgaggacac acactaggcc caaggtgcct gtgctcccag caggttccaa gtgcaanttc 300
aagccaactt tgcgtgttaa cttcaacggg gacttccaag cttccaagct aacttttgtg 360
gtgttaacct tcaanaaaan caanaaaggg gggcttnggg gcattttggt ncct 414

<210> 258
<211> 373
<212> DNA

<213> Homo sapiens

<220>
<221> misc feature
<222> (321)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (328)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (361)
<223> n equals a,t,g, or c

<400> 258
ctccgagtca gggcccaggt gcagctctcc ggtggacaca gaatgcagcc atgctgaggg 60
cagccggagc caaggccctg agaaagcctt cagcccggct tctccatgtg cctggaacgt 120
gtgtgtcacc aggaaggccc ccctgctggc ctctgacagt agctcctctg ggggctccca 180
cagcgaggat ggcgaccaga aggcagcgag tgccatggat gcggtgagca ggggtcccgg 240
ccgggaggcc ccccgctgcc cacagtggcc aagacagaag aagcttttgg caaggttcgg 300
ttttctgaca accggctttt naancctncc ttgcccccgc gccaaaagga nttaatttct 360
ngcccaagcg ttg 373

<210> 259
<211> 529
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (287)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (377)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (438)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (443)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (444)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (495)
<223> n equals a,t,g, or c

<400> 259
aaactaacag atgaagaagt agatgaaatg atcagagaag cagatattga tggagacgga 60
caagtcaact atgaagaatt cgtacagaat gatgactgca aaatgaagac ctactttcaa 120
ctcctttttc ccccctctta gaaagaatca aatttgaatc ttttacttac ctccttgcaa 180
aaaaaagaaa aaagaaaaaa ttccatttat tcatccttgt ttcctatata gccaaactga 240
atgttcaaaa gtaccttcct tgtcccacac acacaaatct gcatgtntgg ttgggggggt 300
ccctgtcccc ctaaagatca agctacactt cccattttta caatataata cttgttctac 360
cttatgatag atccctnaaa agtttcccct ttgctaatga ttatacctgt ttgggtggcc 420
agttttccct gcttgcantt gannaatgac ccagccggcc tttgttttaa attgaaatga 480
aaacaattcc aaccntccat ggttcccgtc cattgttaat taatggcca 529

<210> 260
<211> 566
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (361)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (413)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (460)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (473)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (509)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (562)
<223> n equals a,t,g, or c

<400> 260
actgtctgta tattacggaa gctcttttca cataatatga ctcgtctgcg aaagtttatg 60
gtttactttg gaaagaacca aagtttgcag aagatacaga aaactcctct ctttgtggcg 120
gcgatctgtg ctcattggtt tcagtatcct tttgacccat cctttgatga tgtggctgtt 180
ttcaagtcct atatggaacg cctttcctta aggaacaaag cgacactgaa aattctcaaa 240
gcaactgtgt cctcctgtgg tgagctggcc ttgaaagggt tttttcatg ttgctttgag 300
tttaatggat ggatggatct cgcagaagca gggggtggat ggaagatgaa gatctaacca 360
ngtgcttgga tgagcaaatt ttacagccca gagactaaga ccattctacc ggnttttttaa 420
gttccggcct tccaagnaat tcttggcggg ggatgaggcn ggattgaact ccngggatcc 480
agataggcag gaacatcaag attggggang gtaaccattg gaacaaacca ctcacccagg 540
tgacggtaag cgcctacaac antttt 566

<210> 261
<211> 502
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (44)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (61)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (72)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (75)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (89)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (98)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (146)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (149)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (151)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (157)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (169)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (176)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (180)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (190)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (194)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (211)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (224)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (231)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (235)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (246)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (247)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (273)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (334)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (362)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (375)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (454)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (477)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (497)
<223> n equals a,t,g, or c

<400> 261
ggttaaaagt ggantgtatg ttgtnataga agttaaagtt gcanctnatt atggaataga 60
nataacctgt cnaanttatc tgatgacana ttaccaangt gctccccat ccccacagta 120
tagaangatt atttgcatgg gtgcanaana naatggnttg ccgctggant atcaanagan 180
gttaanagcn ttanaaccaa atgactatac ntgaaaggtc tcanaagaaa ntgangacat 240
catcannaag ggggaaacac anactcttta gancataaca gaatatatct aagggtattc 300
tatgtgctaa tatanaatat tattaacact tganaacang gatctggggg atctccacgt 360
tngatccatt ttcannagtg ctctgagagg agtatcttac ttggggtgac tccttgtttt 420
tagactatac tcagaaactg ggatanggag ttanaccatt taaaacgggt gtatganggc 480
ctgnaatatg tgacaantga at 502

<210> 262
<211> 489
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n. equals a,t,g, or c

<220>
<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (464)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (477)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (483)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (486)
<223> n equals a,t,g, or c

<400> 262
gnngacgcgt gggtccggga tgaggagtgg ggtggccact ccccccggag tcccagggga 60
tgggaccagg agcccgccag ggagcaggca ggcgggggct ggcgggccag gcggccccgg 120
gcccgctccg tggacgccct ggacgacctc accccgccga gcaccgccga gtcagggagc 180
aggtctccca cgagtaatgg tgggaggaga agccgggcct acatgccccc gcggagccgc 240
agccgggacg acctctatga ccaagacgac tcgagggact tcccacgctc ccgggacccc 300
cactacgacg acttcaggtc tcgggagcgc cctcctgccg accccaggtc ccaccaccac 360
cgtacccggg accctcggga caacggntcc aggtccgggg acctccccta tgatgggcgg 420
ctactggagg aggctgtgan gaagaagggg tcggacgaga ggangagacc ccacaangag 480
gangangaa 489

<210> 263
<211> 93
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature

<222> (22)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (75)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (93)
<223> n equals a,t,g, or c

<400> 263
gcggctgccc gcctcgcgcg tnttccctgc ccgggtctcc tcgctgtcgc ngccgatgcc 60
acaccatggc cttcnncacc aggcagttca tgn 93

<210> 264
<211> 389
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (45)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (72)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (106)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (178)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (241)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (249)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (309)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (327)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (358)
<223> n equals a,t,g, or c

<400> 264
ggcagagtnt gctcttggga agtncaggct cggttgtctt ttggnagcca tggagagtga 60
ctttaatctg cnttactacg tggggcacaa gggcaagtcc ggccangagt tcctggagtt 120
tgaagtttcg accggacgga gcttgaaatc gtcattggag atgaacacat ttcttttnac 180
aacatcaaaa attggttccc ttattgatgt caatcatgcc aaggatccag aaggcttacg 240

nagtatttna ttatcttgtc caggacctga agtgtttggt cttcagtctt attgggttac 300
acttcaagnt taaaccatct agactgnata ttngtgtggg acanggggt gggtgggngt 360
aggaaatttt gtgtattttc aggggcatt 389

<210> 265
<211> 400
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (342)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (343)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (389)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<400> 265
tttgcccacg cgtccgccca cgcgtccgcc cacgcgtccg cccacgcgtc cgcaccccca 60
tcccagtccc agcctacttc cgccacgcag aacctggatt ctccctcaag aggcccaggg 120
ggctcagccg gagcctccca cctccgcccc ctgccaaggg cagcattccc atcagccgcc 180
tcttccctcc tcggacccca ggctggcacc agctgcagcc ccgcgggtgt cattccgggc 240
gaaggcctag agactctgca gagccctggg tatgacccaa gccgcaaaag tctttnttca 300
agcaaagntt caaaaggtta agccgcttgg gcaatggttt annggaaagg ttttaagggg 360
gcctccaagg gaggacggcc ggttttttnn ggaaaagggt 400

<210> 266
<211> 382
<212> DNA

<213> Homo sapiens

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (44)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (49)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (88)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (103)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (109)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (162)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (166)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (185)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (220)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (248)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (278)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (301)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (326)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (341)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (362)
<223> n equals a,t,g, or c

<400> 266
ggacctggan cggaggcggg aagaaagtca tacccagatc cnanatccnc acgcagaatg 60
cacaggtgag ctgccgctgg gccccgganca tgctgggcgt tcncacctng cagactgcac 120
gctccaaccg cccgctccac ctactctttc caggcccggc ancttntgga gaaggaattc 180
agcanncttta tctccttagg cacagacagg ctgctggacn aggacatgcg ccaagtcttt 240

cagttcgntc cccatcctgg cggaagatgt tccgggganga aggacctccg aggcgtaact 300
ngccgactca ctgagatgtt gccccncaac tttcgttcgg ntgcagcggn attcctgggc 360
tnttccgggg ctccctttc cc 382

<210> 267
<211> 449
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (374)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (433)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (447)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (448)
<223> n equals a,t,g, or c

<400> 267
gggcgatggc tgaaggacca ggagctgagc cctcgggagc cggtgctgcc cccacagaag 60
atggggccta tggagaaatt ctggaataaa tttttggaga ataaatcccc ttggaggaaa 120
atggtccatg gggtatacaa aaagagtatc tttgttttca ctcatgtact tgtacctgtc 180
tggattattc attattacat gaagtatcat gtttctgaaa aaccatatgg catagttgaa 240
aagaagtcca gaatattccc tggtgataca attctggaga ctggagaagt aattccacca 300
atgaaagaat ttcctgatca acatcattaa agattatgta aaaaggtaaa aggcttatga 360
gcctaagttt ggtnctatat taccatattt actggaattt tcttggaaaa gtactttaat 420
aaagtttaat ctnagaaaaa aaaaannna 449

<210> 268
<211> 594
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature

<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<400> 268
ngcaagcnga caccaaccct cactaaaggg aacaaaagct ggagctccac cgcggtgcgg 60
ccgctctaga actagtggat cccccgggct gcaggaattc ggcacgaggt cagtgtcggg 120
cgcagacggc ggcagtgcgg cttgctcttg gaagttcagg ctcggttgtc ttttgggagc 180
catggagagt gacttttatc tgcgttacta cgtggggcac aagggcaagt tcggccacga 240
gttcctggag tttgagtttc gaccggacgg gaagttaaga tatgccaaca acagcaatta 300
caagaatgat gtcatgatca gaaaagaggc ttatgtacat aaaagcgtga tggaggaact 360
gaagagaata attgacgaca gtgaaattac caaagaggat gatgcattgt ggcctcctcc 420
tgaccgagtg ggccggcagg agcttgaaat cgtcattgga gatgaacaca tttcttttac 480
aacatcaaaa attggttccc ttattgatgt caatcaatcc aaggatccag aaggcttacg 540
agtattttat tatcttgtcc aggacctgaa gtgtttggtc ttcagtctta ttgg 594

<210> 269
<211> 332
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (240)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (275)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (321)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<400> 269
gcgggatttg ggtcgcagnt cttgtttgtg gattgctgtg atcgtcactt gacaatgcag 60
atcttcgtga agactctgac tggtaagacc atcaccctcg aggttgagcc cagtgacacc 120
atcgagaatg tcaaggcaaa gatccaagat aaggaaggca tccctcctga ccagcagagg 180
ctgatctttg ctggaaaaca gctggaagat gggcgcaccc tgtctgacta caacatccan 240
aaagagtcca ccctgcacct ggtgctccgt ctcanaggtg ggatgcaaat cttcgngaag 300
accctgactg gcaagaccat nacccttgag gn 332

<210> 270
<211> 515
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<400> 270
gcnnganacn aaccctcact aaagggaaca aaagctggag ctccaccgcg gtgcggccgc 60
tctagaacta gtggatcccc cgggctgcag gaattcggca cgagggatgt tgatgtcctg 120
catctaacgc ggtgtaaccc ccgaagccga gcgagctccg gaggaatttc agtatctgct 180
acggtaactt catcagcccg ccaagatggc gatgcaagcg gccaagaggg cgaacattcg 240
acttccacct gaagtaaatc ggatattgta tataagaaat ttgccataca aaatcacagc 300
tgaagaaatg tatgatatat ttgggaaata tggacctatt cgtcaaatca gagtggggaa 360
cacacctgaa actagaggaa cagcttatgt ggtctatgag gacatctttg atgccaagaa 420
tgcatgtgat cacctatcgg gattcaatgt ttgtaacaga taccttgtgg ttttgtacta 480
taatgccaac agggcatttc agaagatgga cacaa 515

<210> 271
<211> 141
<212> DNA

<213> Homo sapiens

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (39)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<400> 271
cactccatgg gnnnctctgt gtggnatttg gggcccctnc atacttcatt tattatatta 60
tcaaaactga gagggatagg aaagtaaaaa cttatccagg taggaaaatt ggatcgaaca 120
tttcacctct catattaagg n 141

<210> 272
<211> 433
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (32)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (49)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (52)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (94)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (139)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (166)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (177)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (187)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (198)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (244)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (248)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (259)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (274)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (276)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (288)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (355)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (396)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (402)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (427)
<223> n equals a,t,g, or c

<400> 272
gagcggcggc ggaccgcagc gaagtggcga gntagtggca aacgttgant tntgaagggg 60
ggcccaagat gaccggttct aacgaagttc aagntgaacc agccacccgg aggatagcat 120
ctcctccgta aagttcagnc ccaacacctc ccagttcctg cttgtntcct cctgggncac 180
gtccgtncga ctctacgnat gtgccggcca actccatgcg gctcaagtac cagcacaccg 240
gagncgtnct ggactgcgnc ttctacggtc caangnatgc ctggagtnga ggactagatc 300
atcagttgaa aatgcatgat ttgacactga tcaagaaaat ttcttggacc catgntgccc 360
tatnagatgt gttgaatact gtcagaagtg aattanaatg gnactggaag ttggggttag 420
ccagttnacc tgt 433

<210> 273

<211> 432
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (187)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (190)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (371)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (373)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (380)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (430)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (432)
<223> n equals a,t,g, or c

<400> 273
ggttcatctc cgtctcagaa aagagcaagg atcgcggcag caacacgatc ggcgcccgcc 60
tgaaccgagt agaagacaag gtgacgcagc tggaccagag gctggcactc atcaccgaca 120
tgcttcacca gctgctctcc ttgcacggtg gcagcacccc tgagcccact gtgcgtgggg 180
ctcccgnctn caacccctcg cccagtccca gcagccagcc aaacacacag aaggggactg 240
ccaccttccc ttgccagctg ctgagccgca gagaagtgac ggttcctaca caggacaggg 300
gttccttctg ggcattacat cgcatagaaa tnaataattt gtggtgattt ggatctgggt 360

tttaatgaat ntnacagtgn gactttgatt attaattgag caagcttttc ctaataaacg 420
tggagaattn cn 432

<210> 274
<211> 276
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (95)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (234)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (255)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (264)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (265)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (269)
<223> n equals a,t,g, or c

<400> 274
gatcgcttct ctgggtccaa gtctgccagc acggcctccc tgaccatctc tgggctccag 60
gctgaggacg aggctgatta ttactgcagc tcatntacaa gtagtatctc ttatgtcttc 120
ggaactggga ccaaggtcac cgtcctagtc cagcccaagg ccaaccccac tgttcactcc 180
tgtttccccc cctcctcctt aagaacttcc aagcccaaca aaggcaacta tgtnttttgg 240
aaccattact tctanccggg aaannttna aaatgc 276

<210> 275
<211> 351
<212> DNA
<213> Homo sapiens

<220>

<221> misc feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (78)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (87)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (117)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (150)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (154)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (174)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (178)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (206)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (219)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (241)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (248)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (288)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (303)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (329)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<400> 275
ccgcagacta gggcgcctcg ggccagggga acgcggaaga gccatggnca ccggctaacg 60
gggccgtgga aaacgggnac cggacangaa gccgccggcc ctgccgcgcc ccatccncaa 120
cctggaagtc gagttcacca agatatttan caanaatgga atgggacgaa tccnagantg 180
ggaaaaagtg tgctacatgt taccctcaa ctccggganc aaatatgtga agtggaagaa 240
ngagatangg ccgacgtggg acgaaggctg tggaagctgc acagggtngc tnccaaaaag 300
ggntccccca tgggcgcccg gtgggatgnc ctgaattcct tggccggtng c 351

<210> 276
<211> 463
<212> DNA
<213> Homo sapiens

<400> 276
gctgaattct ggctgaccag ggcagtcacc agagctccag acaatgtctg tctccttcct 60
catcttcctg cccgtgctgg gcctcccatg gggtgtcctg tcacaggtgc agctgcagca 120
gtcaggtcca ggactggtga agccctcgca gaccctctca ctcacctgtg ccatctccgg 180
ggacactgtc tctaggaaca gtgctggttg gaactggatc aggcagtccc catcgagagg 240

ccttgagtgg ctgggaagga catactacag gtccaaatgg tataatgatt atgccgtatc 300
tgtgaaaagt cgaataacca tcaacgcaga ttcaaccaag aatcagttct ctctgcagct 360
gaactctgtg actcccgagg acacggctct gtattactgt gcaagagatc ggggcagctg 420
gtccgatgaa gccgaggggc tcccgccgcg ttacttctac tac 463

<210> 277
<211> 463
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (392)
<223> n equals a,t,g, or c

<400> 277
ctgtcctcta gagaaaaccc tgtgagcaca gctcctcacc atggactgga cctggaggat 60
cctcttcttg gtggcagcag ctacaagtgc ccactcccag gtgcagctgg tgcagtctgg 120
tgctgaggtg aagaagcctg gggcctcagt gaaggtctcc tgcaaggctt ctggatacac 180
cttcaccagt tatgatatca actgggtgcg acaggccact ggacaggggc ttgagtgggt 240
gggatggatg aaccctaaca gtgctaacac aggctatgca cagaagttcc agggcagagt 300
caccatgacc aggaacacct ccataagcac agcctacatg gagctgagca gcctgagatc 360
tgaggacacg gccgtctatt actgtgcgag anggaggcgg tgggagctgc tcgggatgat 420
gtgggacttt gactactggg gccagggaac cctggtcacc gtc 463

<210> 278
<211> 343
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (172)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (271)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (284)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (293)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (294)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<400> 278
ggcagaggga tctcagggct tctttttctg tcctccacca tcatggggtc aaccgccatc 60
ctcgccctcc tcctggctgt tctccaagga gtctgtggcg aggtgcagct ggtacatgct 120
ggaggagaga tgaggaaagc ccggggagtc tctgaagatc tcctgtgaag gntgttggga 180
tacacctttg aacatctact gggatcggct gggtgcgcca gatgcccggg gaaggcctgg 240
gagtgggtgg ggcatcatat gtcctggtga ntctgatggc cagngatagc canncttttc 300
gagggccaga tgcancatgt gcagtcgaca agtgccacca aca 343

<210> 279
<211> 436
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (121)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (151)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (211)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (326)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (362)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (373)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (392)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (403)
<223> n equals a,t,g, or c

<400> 279
gcaccatggc ttggacccca ctcctcttcc tcaccctcct cctccactgc acagggtctc 60
tctcccagct tgtgctgact caatcgccct ctgcctctgc ctccctggga gcctcggtca 120
ngctcacctg cactctgagc agtgggcaca ncgactacgc catcgcatgg catcagcagc 180
agccagagaa gggccctcgg tacttgctga ngcttaacac tgatggcagc cacaggaagg 240
gggacgggat ccctgatcgc ttctcaggct ccagctctgg ggctgagcgc tacctcacca 300
tctccagcct ccagtctgag gatgangctg actattactg tcagaactgg ggctttggga 360
tngtattcgg cgnaagggac caanctgaac gncctaagtc agnccaaggc tgccccctcg 420
gtcaatctgt tcccgg 436

<210> 280
<211> 315
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (138)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (224)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (246)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (280)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<400> 280
ggcacgagct cccccagcct tgctgaagat ccgttccaag gagggcaggt gtgcgcacca 60
tcccgggcta tacagnccat ctgcctgccc tcgatgtata acgatcccca gtttggcaca 120
agctgtgaga tcactggnct ttggaaaaag gaattctagt gaagtgaaca attgcgaact 180
gaacttagga aggtcctgga ggagtgtttt gacctggaaa atgnagccca gtgtggttca 240
agggtnagac tgcagagttt agaggtgggg agcactgagn cggtggcaga ttgggtccca 300
gggttggntt gaagn 315

<210> 281
<211> 411
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (305)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (358)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (403)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (411)
<223> n equals a,t,g, or c

<400> 281
ggcaggttgg agccgctgcc gtcgccatga cccgcggtaa ccagcgtgag ctcgcccgcc 60
agaagaatat gaaaaagcag agcgactcgg ttaagggaaa gcgccgagat gacgggcttt 120
ctgctgccgc ccgcaagcag agggactcgg agatcatgca gcagaagcag aaaaaggcaa 180
acgagaagaa ggaggaaccc aagtagcttt gtggcttcgt gtccaaccct cttgcccttc 240
gcctgtgtgc ctggagccag tcccaccacg ctcgcgtttc ctcctgtagt gctcacaggt 300
cccancaccg atggcattcc ctttgccctg agtctgcanc gggtcccttt tgtgcttnct 360
tcccctcaag tacctntttc cccctgggcc acttccgggg gtnagggggg n 411

<210> 282
<211> 570
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (217)
<223> n equals a,t,g, or c

<400> 282
gcaagnngaa antaaccctc actaaaggga acaaaagctg gagctccacc gcggtgcggc 60
cgctctagaa ctagtggatc ccccgggctg caggaattcg gcacgagtag agacagcgcc 120
ggggcaagtg agagccggac gggcactggg cgactctgtg cctcgctgag gaaaaataac 180
taaacatggg caaaggagat cctaagaagc cgagagnaaa atgtcatcat atgcattttt 240
tgtgcaaact tgtcgggagg agcataagaa gaagcaccca gatgcttcag tcaacttctc 300
agagttttct aagaagtgct cagagaggtg gaagaccatg tctgctaaag agaaaggaaa 360
atttgaagat atggcaaaag cggacaaggc ccgttatgaa agagaaatga aaacctatat 420
ccctcccaaa ggggagacaa aaaagaagtt caaggatccc aatgcaccca agaggcctcc 480
ttcggccttc ttcctcttct gctctgagta tcgcccaaaa atcaaaggag aacatcctgg 540

gctgtccatt ggtgatgttg cgaagaaact 570

<210> 283
<211> 366
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (32)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (39)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (327)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (337)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (357)
<223> n equals a,t,g, or c

<400> 283
gntnatgtgn aattaagaca aataaaaacg tnaagcggna caaatcacag agagccacaa 60
agcggatttc acacatgcct agcagaccag aactctcggc agttgctaca agggaagaaa 120
ggactatgtg gatcccttgt ggctatgcag atacctacct cacagagttg ttgtagaaga 180
ctggtggttt ggttcaaacc ttgtgattaa agagtttgtc aagcatttta ttcttttgaa 240
taaaagcaac atatctaaaa catttaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 300
aaaaaaaaaa aaaaaaaaaa aaagggnggc cgntttnaag gatccaanct tacgaancgt 360
gcatgc 366

<210> 284
<211> 414
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (389)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (395)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (398)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (407)
<223> n equals a,t,g, or c

<400> 284
ggaagctgag acaggcattc caaggggact ccatcccggt tttcgacctg ctgatcctgg 60
gggtgggccc cgatggtcac acctgctcac tcttcccaga ccaccccctc ctacaggagc 120
gggagaagat tgtggctccc atcagtgact ccccgaagcc accgccacag cgtgtgaccc 180
tcacgctacc tgtcctgaat gcagcacgaa ctgtcatctt tgtggcaact ggagaaggca 240
aggcagctgt tctgaagcgc attttggagg accaggagga aaacccgctg cccgccgcct 300

ggtccagccc cacaccggga aactgtgctg gtcttggacg aggcggccgc cgcttctgac 360
cgtgcccttc gagaaacatt ccactttgna actnngcnca aaggacnccc aaat 414

<210> 285
<211> 551
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (22)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (64)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (180)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (225)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (234)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (271)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (298)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (319)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (322)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (365)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (410)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (482)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (526)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (528)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (536)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (545)
<223> n equals a,t,g, or c

<400> 285
gtccngcntg agccgcacgg cngnacgctc gtcttcgccc gccatggccg agagcgactg 60
gganacggtg acggtgctgc gcaagaaggg ccctacggac gcccagcaac atccaagcag 120
gctatcttag cggcacaaag actaggagaa gatgtggaga cttccaataa atgggctgcn 180
ggccanaaca aacaacattc tattaccaag aacacggcca agctngaccg gganacagag 240
tgctgcacca tgacaggtga ccctgaagtg ngtcaagtga tccagcaagt cggcananca 300
agggcttaca cataacganc tngnnacgaa aatcatgata agccacagtg atcgcagact 360
atganagngg tacggccata cccaataacc agtgcttggc aaaatcgacn ggaccattgg 420
ctccaagctc cgggaaagac attggaaaac ccatcgagaa gggcctaggc gaaatgaaca 480
cnaagcctcg aaatcatgag ctccagctga tctcttccgc cgttcncntg gccgcnattc 540
cgttntcctc a 551

<210> 286
<211> 615
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<400> 286
gcngacacca accctcacta aagggaacaa aagctggagc tccaccgcgg tgcggccgct 60
ctagaactag tggatccccc gggctgcagg aattcggcac gagtattgcc tctgagggag 120

tccaactgta tacctgcatc agtgtcattc ctttgtgtga tttcttaatg ctgtatttgt 180
tcatctcaaa cctagatgta tacagctctg agttataaat ggttataaag ctcctgttac 240
tcatattagt tatttacatc aaaaagcttt tagaaaatgg tacgaggtaa ccaattcttg 300
tcatggtgaa atctgattga gtaaccaagc agttttacta ttctggtgct gcttcataac 360
aaaaatgaaa agctgcatgc atctacagca ggcatggatt gtttatgtcg tatgatatcc 420
tttattaagt aagttcactt atagtatttc tataatttga ttcattgccg taatagagcc 480
atgtaggaaa tgcactgatt gcatgttatt gtggcaagaa tatcctaaat gtcattaaaa 540
tcctccaaca tgatggatct acttatggtc ttgtttgttg acatgacaaa ttaacattct 600
tatagttaca tctgg 615

<210> 287
<211> 302
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (221)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (226)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (237)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<400> 287
gcggaatgtc acacacattg atcaggcact ccaggaagct catcgggtgc tgaaaccagg 60
aggacggttt ctctgtctgg aatttagcca agtgaacaat cccctcatat ccaggcttta 120
tgatctatat agcttccagg tcatccctgt cctgggagag gtcatcgctg gagactggaa 180
gtcctatcag taccttgtag agagtatccg aaggtttccg nctcangaag agttcangga 240
catgatagaa gatgcaggct ttcacaaggt gacttacgaa agtctnacat caggcnttgt 300
gg 302

<210> 288
<211> 414
<212> DNA

<213> Homo sapiens

<220>
<221> misc feature
<222> (53)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (57)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (63)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (83)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (86)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (91)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (95)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (96)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (100)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (107)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (116)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (147)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (153)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (157)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (158)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (168)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (201)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (205)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (208)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (212)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (216)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (221)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (227)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (275)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (281)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (298)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (299)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (318)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (341)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (354)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (359)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (363)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (372)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (379)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (385)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (402)
<223> n equals a,t,g, or c

<400> 288
aattcggcac gagagagaga gagagagaga gagagagaga gagagagaga gtngcgntag 60
ttngtgtgtc ctcggtttct cgnctnctgg ntcgnncccn cccacanctg gggcgntcta 120
tgtcgagtgg cgcccatggc gaagagntct canctcnnat gtggaagnct ctcaccttct 180
tcgtcgcgct ccccggggtg ncagncanca tnctgnatgt ntacctnaag tcncaccacg 240
gagagcacga ganacccgag ttcatcgtct acccntatct ncgtatcagg ancaagcnnt 300
ttccctgggg agatngtnac catacttttt tncataaccc ntatgtgnat ccanttccnc 360
ttnntacgga gntgtatana gagantttgn ccattaccgg gncaacaggg ccca 414

<210> 289
<211> 184
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (35)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (101)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (142)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (175)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (176)
<223> n equals a,t,g, or c

<400> 289
ggacttnant tctntggaat gcatngaatg gcagngacgc attggccctg cccttggcct 60
gcattgatga cgagatggac tgtgagcctc agggccccgc ncctggccca gctctccgat 120
gtggccatgc acagcctggg tntggctttc atctatganc agactgacga catcnnggat 180
gttc 184

<210> 290
<211> 207
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (15)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (45)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (63)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (107)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (133)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (149)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (160)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (176)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (200)
<223> n equals a,t,g, or c

<400> 290
ggacgtacng tcctnctagt ngaggaatat gtcgagtttc tctanggctg ccccagcaat 60
ggnccacttt tgctaaaata tggtatatct tagatgggaa aatgcancca cctggcaaac 120
ttgctgctat ggnatctata agacttcang gattacatan acctgcgtac catgcnctga 180
ctgactgtgg ggatcatgtn tgttata 207

<210> 291
<211> 492
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (33)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (448)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (472)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (474)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (477)
<223> n equals a,t,g, or c

<400> 291
gaagagacat tgaacctgga gaagaaattt ctngttatta tggagatggg ttctttggag 60
aaaataatga gttctgcgag tgttacactt gcgaaagacg gggcactggt gcttttaaat 120
ccagagtggg actgcctgcg cctgctcctg ttatcaatag caaatatgga ctcagagaaa 180
cagataaacg tttaaatagg cttaaaaagt taggtgacag cagcaaaaat tcagacagtc 240
aatctgtcag ctctaacact gatgcagata ccactcagga aaaaaacaat gcaacttcta 300
accgaaaatc ttcagttggc gtaaaaaaga atagcaagag cagaacgtta acgaggcaat 360
ctatgtcaag aattccagct tcttccaact ctacctcatc taagcttaac tcatataaat 420
aattccaggg taccaanaga aactgaanaa agtctgcaaa gcctttactt tnanagntaa 480
acattgagaa at 492

<210> 292
<211> 237
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (65)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (79)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (111)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (123)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (129)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (167)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (192)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (210)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (226)
<223> n equals a,t,g, or c

<400> 292
gggggacatg ccatanccnt ccttgggggc ctatggaacc tncaaagcgg ccgtggcgct 60
tactnatgga cacattcanc tgtaaactcc ttccctgggg ggtcaaggtn naccatcatc 120
cancctggnt gcttcaagac agagtcagtg aagaaacgtg ggttcantgg gaaaagcgcc 180
aacaanttgc tnctggccca accttgtctn aagagcttct gcaggnctta cgggaaa 237

<210> 293
<211> 630
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (580)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (588)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (594)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (608)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (609)
<223> n equals a,t,g, or c

<400> 293
gnttggaaag acaccacttg gagtttggca aaacactgct cagagacgag agcctgaata 60
tctttcaaaa cctcaatcgt cgacagcatg agcatgccat ccacatgatg gacattgcaa 120
tcattgccac agacctcgcc ctgtatttca agaagaggac gatgttccaa aagatcgtgg 180
atcagtctaa gacatatgag agttaacagg agtggacaca gtacatgatg ctggagcaga 240
cacggaagga aatcgttatg gccatgatga tgaccgcctg tgatctctca gccatcacca 300
aaccctggga ggtgcagagc caggtagctc tgctggtggc tgctgaattc tgggaacaag 360
gtgacctgga gcgcacggtg ctgcaacaga atcccattcc catgatggac agaaacaaag 420
cagatgaact ccctaagctt caagtcggct tcattgactt tgtttgcacc ttcgtctaca 480
aggaattctc ccgtttccac gaggagatca ccccaatgtt ggacgggatc accaacaatc 540
gcaaggagtg gaaggccgct tgctgatgaa tacgatgccn agatgaangt gcangaagag 600
aagaaacnna aaccagcaag tcggccaagt 630

<210> 294
<211> 346
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (83)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (113)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (205)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (206)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (207)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (220)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (249)
<223> n equals a,t,g, or c

<400> 294
nnagcgctcg cnagtggaac actnattgga atccaaaaaa ttcggacagt gggaaatact 60
ggggtaaatc ctggttaccc canaactata ccctggttga tatgaagatt gantttggtg 120
ttgatataac caccaaagaa atggttcttg ctgatgattc ctggagactg gccattacga 180
gtattgaagc caacagtaaa gacannnagt cttactgggn gctcaaagaa gtaactcctg 240
aagggctcna aatggtaaag aaaagctttg aggccgggca cggtgactca tgcctgtaat 300
cccagcactt tgggaggcca aggcaggcag atcacccaag gtcagg 346

<210> 295
<211> 531
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (206)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (209)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (277)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (311)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (319)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (320)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (345)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (353)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (365)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (374)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (383)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (421)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (423)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (425)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (427)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (430)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (432)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (438)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (441)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (444)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (448)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (462)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (463)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (464)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (471)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (495)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (508)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (519)
<223> n equals a,t,g, or c

<400> 295
gttctgtctc gctgatgtca gacctggagg gcaacaccaa gtcacgtgtc cgcctgttgg 60
tcctcgtgcc accctccaaa ccagaatgcg gcatcgaggg agagaccata attgggaaca 120
acatccagct gacctgccaa tcaaaggagg gctcaccaac ccctccagta cagctggaaa 180
gaagttacaa catcctgaat caagancanc ccctggcccc acccacctca ggttcaacct 240
gttctccctt aaaaaatatc tcccacagaa cacatcnggt ttatantctt gttcctccca 300
gcaataagaa nggaaaccnn tttctgcaac ttcacggtgg ccttncaaat ctnccccccca 360
taaantttgg cccnttttttt tgnctccccg gggggg tttt tttttcacc cccctttatcc 420
ntngngncan cnccttangg ngcngccncc caggggaaag annnaacccc naaaaaaagg 480
gaaaaccggg caccnggacc ctttgaanac cccacactnt aaaatttcca a 531

<210> 296
<211> 572
<212> DNA

<213> Homo sapiens

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (451)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (465)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (489)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (501)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (539)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (546)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (570)
<223> n equals a,t,g, or c

<400> 296
ggttctgccc ccactgctta taatgctggt gatctacatt aagatcttcc tggtggcctg 60
caggcagctt cagcgcactg agctgatgga ccactcgagg accaccctcc agcgggagat 120
ccatgcagcc aagtcactgg ccatgattgt ggggattttt gccctgtgct ggttacctgt 180

gcatgctgtt aactgtgtca ctcttttcca gccagctcag ggtaaaaata agcccaagtg 240
ggcaatgaat atggccattc ttctgtcaca tgccaattca gttgtcaatc ccattgtcta 300
tgcttaccgg aaccgagact tccgctacac ttttcacaaa attatctcca ggtatcttct 360
ctgccaagca gatgtcaaga gtgggaatgg tcaggctggg gtacagcctg ctctcggtgt 420
gggcctatga tctangctct cgcctnttca ngagaagatc aaatncacaa gaaacaaaga 480
ggacacggnt ggttttattg ngaaagatag ctacacctta caaggaaatg gactggctnt 540
tttgancact tcctggaact accacgtatn ta 572

<210> 297
<211> 334
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (44)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (67)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (74)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (84)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (90)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (106)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (108)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (118)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (131)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (167)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (176)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (177)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (219)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (227)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (263)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (293)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (316)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (317)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (319)
<223> n equals a,t,g, or c

<400> 297
ggcagaaaga aaggccctgc tcctccaggg ctccaacgag atcnaaatcc gcgcccgagg 60
gcaacanccg cttnacctac agcntcactn tcgatggctg cacgantnac accggagncc 120
tggggcaaga nagtgaattg aattacaaaa ccaccaagac ctcccgnttg cccatnnatc 180
gatgtggccc ccttggaacg ttggtgcccc aaaccaggna attcggnttc gaacgttggg 240
ccctgtttgg tttcctgtaa aantcccttc cattcccaac ctgggttccc tnnccaaccc 300
aaccaaattt ttccnnncna acccgggaaa cagg 334

<210> 298
<211> 293
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (23)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (165)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (199)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (237)
<223> n equals a,t,g, or c

<400> 298
atggaggccg ctgactaccg agnggccagc agccagcagg gcctggccta tgccacagag 60

gctgtctatg aaagcgcaga ggccccgggc cactatcccg cagaggacag cacctacgat 120
gagtacgaga acgatctggg gatcacagcc gtcgccctgt acgantacca ggctgcgggc 180
gatgatgaga tctcatttna ccctgatgac atcatcacca acatcgagat gattgangac 240
ggctggtggc gcggggtgtg caagggccgc ttcagggagc tcgcattctc ttg 293

<210> 299
<211> 418
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (59)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (78)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (114)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (154)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (168)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (213)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (221)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (241)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (260)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (269)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (278)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (284)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (294)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (313)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (334)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (346)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (347)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (352)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (354)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (355)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (358)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (373)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (377)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (379)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (383)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (392)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (393)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (408)
<223> n equals a,t,g, or c

<400> 299
aattcggcac gaggggcctg ggcgttttnt tgttggtctt cgtgctgggt ctgggtctna 60
ccccaccgac nttggntnag gataactcca ggtacacaca cttcctgacc cagnactatg 120
atgccaaacc acagggccgg gatgacagat actntgaaag catcatgngg agacggggcc 180
tgacctgacc ctgcaaagac atcaacacat ttnttcatgg naacaagcgc agattcaagg 240
ncatctgtga aaacaaggan tggaaaccnt tacagggnaa cctnaggttt angnaagttt 300
ttttttcca ggnaaccatt tggaaagttn aatnggggt ttcccnnggg tntnnaanga 360
ctttcccggg gcnaaangng ggnttaaaaa anntttttt tttttttnga aaaaggtt 418

<210> 300
<211> 346
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (97)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (107)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (277)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (317)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (320)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<400> 300
ccacaaacag tttgcatccc tagaacatgg cattgtgcca nttaccagtg attgccagta 60
cctcttccct gccaaggttg tctctcgcct ggtgaantgg gtgacanttg cccatgagga 120
ttacatggag ctgcacttca ccaaagacat tgtggatgcg ggactggctg gggacaccaa 180
tctctactac atggcgctca tcgaaagggg cacagccaaa ctgcaggccg ctgtggtgtt 240
gaaccctggc tactcctcca tcccacctgt tttccanctc tgtttgaact ggaaangggа 300
gaaaaccaac agcaacnatn acaacattcn gggccatgga gggcga 346

<210> 301
<211> 213
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (46)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (60)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (66)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (80)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (119)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (130)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (165)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (170)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (202)
<223> n equals a,t,g, or c

<400> 301
gctttataat ctgctcatnt ttgcctaata aatgcaacat ccacangaac tgaatttctn 60
aaaaanttgg tactaccagn tattggttcg tttacaatta ttgatggaaa tcaagtcanc 120
ggacaaaatn ctggaaacaa tttcttcctt caaaaaatct tatcngcaan aaccgactga 180
agctgccata gatttcctta cnagaattaa ata 213

<210> 302
<211> 440
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (121)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (342)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (363)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)
<223> n equals a,t,g, or c

<400> 302
ggcacgagcg agaccccagc aggcaccatc ctttaccacg ctcatttaga catcgaggcc 60
ttcaccatgg accgggaagt gcgcaaaatc aaacaaggcc tgggcttgaa atttgctgag 120
ntggtgtata ccggtttctg gcacagccct gagtgtgaat ttgtccgcca ctgcatcgcc 180
aagtcccagg agcgagtgga agggaaagtg caggtgtccg tcctcaaggg ccaggtgtac 240
atcctcggcc gggagtcccc actgtctctc tacaatgagg agctggtgag catggatgag 300
aacctcatgc acatcagcta cgangctgga atcctggaga ancccaagaa ccaagcgctc 360
cangtcttaa acgaagaccc angacccagc caaagcccca acaaccctga catctccgag 420
atcgagttca aaaaagggtc 440

<210> 303
<211> 495
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (22)
<223> n equals a,t,g, or c

<400> 303
ctcataaggg accaaagctg gngctccacc gcggtggcgg ccgctctagc actagtggat 60
cccccgggct gcaggacgcc atgttggggt ttgtgggtcg ggtggccgct gctccggcct 120
ccggggcctt gcggagactc acccccttcag cgtcgctgcc cccagctcag ctcttactgc 180
gggccgtccg acggcggtcc atcctggtga gagcacagta aggactattg ctatggatgg 240
tacagaaggc ttggttagag gccagaaagt actggattct ggtgcaccaa tcaaaattcc 300
tgttggtcct gagactttgg gcagaatcat gaatgtcatt ggagaaccta ttgatgaaag 360
aggtcccatc aaaaccaaac aatttgctcc cattcatgct gaggctccag agttcatgga 420
aatgagtgtt gagcaggaaa tcttgtgact ggtatcaagg ttgtcgatct gctagcttcc 480

tatgccaagg gtggc 495

<210> 304
<211> 293
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (284)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (287)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (289)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<400> 304
ggtcagggac aagatggtgc caccggtgca ggtctctccg ctcatcaaga ttacctaaaa 60
cctcgggcag aagaggagag gaggatagca gcagaagaga agaagaagca ggatgaactg 120
aaacggattg ccagagaatt ggcagaagat gacagcatat taaagtgagt gaccctgcga 180
cccactcttt ggaccagcag cggatgaata aagcttcctg tgttgtgtga aaaaaaaaaa 240
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaagggg cggncnntnt tna 293

<210> 305
<211> 261
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (36)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (181)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (190)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (205)
<223> n equals a,t,g, or c

<400> 305
ccggaatcgg ccctgtngcc cccgcccgca ctccanagcc ggctgagaac ggcagcggcg 60
agggctccac gtgcagcgtc tctccgggca ccttcgggtc caggactaca actcccggca 120
gggtgcgcaa aacgaccgcc caaggcaacg gaggctcacg agaatcagca tgattcttca 180
naggctcttn aggttctcct ctgtnattcg gtcagccgtc tcagtccatt tgcggaggaa 240
cattggtgtt acagcagttg g 261

<210> 306
<211> 502
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (147)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (165)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (173)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (213)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (260)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (270)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (274)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (293)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (316)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (346)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (423)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (436)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (462)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (468)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (488)
<223> n equals a,t,g, or c

<400> 306
gcaacactaa aggacgaacc tgatctctta tactagtatc nttaatcatt tttattgcca 60
caactaacct cctcggactc ctgcctcact catttacacc aaccacccaa ctatctataa 120
tcctagccat ggccatcccc ttatgancgg gcgcagtgat tatangcttt cgntctaaga 180
ttaaanatgc cctagcccac ttcttatcaa aangcacacc tacacccctt atccccatac 240
tagttattat ggnaaacatn atcctactcn ttcnaccaat agccctgggc gtnagcctaa 300
tcgcttacat tactgnaggg cacntactca tgcacctcat tggaancgtc ccctacaata 360
tcaatcatta aacttccctc tacacttatc tcttcacatt ctattctaac ttaatatcct 420
aanaaattcc ttttcncttt attccaagcc caactttttc cnactttntt cttaaacccc 480
ttactttncg aaaaaccttt tt 502

<210> 307
<211> 119
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (33)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (67)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (113)
<223> n equals a,t,g, or c

<400> 307
aaccgactat gganttacag ccacaaagca agnggtgaan gctggaacat tcttttggtc 60
tgttgtnatc cctcanttgc ggagaatatt aaccatattg cagtggctca ccntaccag 119

<210> 308
<211> 403
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (375)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (388)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (389)
<223> n equals a,t,g, or c

<400> 308
gcggacggnc ngngaaggtg cttaagcggc tgcgacttca gaagcgaggc acaggcggtg 60
tggacacggc tgcggtgggc ggggtcttcg acgtctccaa cgctgaccgc ctgggcttct 120
cagaggtgga gctggtgcag atggtggtgg acggagtgaa gctgctcatc gagatggagc 180
agcggctgga gcagggccag gccatcgacg acctcatgcc tgcccagaaa tgaagcccgg 240
cccacacccg acaccagccc tgctgcttcc taacttattg cctgggcagt gcccaccatg 300
cacccctgat gttcgccgtc tggcgagccc ttagccttgc tgtnagagat tccgttcaac 360
cttggtanaa tttantttt tgatgggnna agatatgctg atg 403

<210> 309
<211> 559
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<400> 309
aagcngacac caccctcact aaagggaaca aaagctggag ctccaccgcg gtgcggccgc 60
tctagaacta gtggatcccc cgggctgcag gaattcggca cgaggtttat ctcaaggcct 120
gagtagccgg taacaaacga gggttcccgg gattggaccg acgcagccat gcctctgcga 180
cttgatatca aaagaaagct aactgctaga tctgatcgag ttaagagtgt ggatctgcat 240
cctacagagc catggatgtt ggcaagtctt tacaatggca gtgtgtgtgt ttggaatcat 300
gaaacacaga cactggtgaa gacatttgaa gtatgtgatc ttcctgttcg agctgcaaag 360
tttgttgcaa ggaagaattg ggttgtgaca ggagcggatg acatgcagat tagagtgttc 420
aattacaata ctctggagag agttcatatg tttgaagcac actcagacta cattcgctgt 480
attgctgttc atccaaccca gcctttcatt ctaactagca gtgatgacat gcttattaag 540
ctctgggact gggataaaa 559

<210> 310
<211> 521
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (227)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (245)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (494)
<223> n equals a,t,g, or c

<400> 310
ggagatgtnt cgctccgtgg ccttagctgt gctcgcgcta ctctctcttt ctggcctgga 60
ggctatccag cgtactccaa agattcaggt ttactcacgt catccagcag agaatggaaa 120
gtcaaatttc ctgaattgct atgtgtctgg gtttcatcca tccgacattg aagttgactt 180
actgaagaat ggagagagaa ttgaaaaagt ggagcattca gacttgnctt tcagcaagga 240
ctggnctttc tatctcttgt actacactga attcaccccc actgaaaaag atgagtatgc 300
ctgccgtgtg aaccatgtga ctttgtcaca gcccaagata gttaagtggg atcgagacat 360
gtaagcagca tcatggaggt ttgaagatgc cgcatttgga ttggatgaat tccaaattct 420
gcttgcttgc tttttaatat tgatatgctt atacacttac actttatgca caaaatgtag 480
ggttataata atgntaacat ggacatgatc ttctttataa t 521

<210> 311
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (52)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (528)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (537)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (557)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (563)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (571)
<223> n equals a,t,g, or c

<400> 311
ggccccctgc aggtaccggt ccggaattcc cgggtacggc tgcgagaaga nnacagaagg 60
ggattcctga agctgacagc attcgggccg agatgtctcg ctccgtggcc ttagctgtgc 120
tcgcgctact ctctctttct ggcctggagg ctatccagcg tactccaaag attcaggttt 180
actcacgtca tccagcagag agtggaaagt caaatttcct gaattgctat gtgtctgggt 240
ttcatccatc cgacattgaa gttgacttac tgaagaatgg agagagaatt gaaaaagtgg 300
agcattcaga cttgtctttc agcaaggact ggtctttcta tctcttgtac tacactgaat 360
tcaccccac tgaaaaagat gagtatgcct gccgtgtgaa ccatgtgact ttgtcacagc 420
ccaagatagt taagtgggat cgagacatgt aagcagcatc atggaggttt gaagatgccc 480
gcatttggat tggatgaatt caaattctgc ttgcttggtt tttaatantg atatgcntat 540
acacttacct ttatgcncaa aanggtaggg ntataataat ggtaacatgg g 591

<210> 312
<211> 584
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (20)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (33)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (35)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (119)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (259)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (299)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (310)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (327)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (329)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (365)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (400)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (508)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (527)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (535)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (553)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (576)
<223> n equals a,t,g, or c

<400> 312
gagnttcccg ggtncgacgn cacgcgtccg aantnaaaat ttttaaaaaa aaaaaaaaaa 60
aaaaaaaaaa aaaagggcgg ccgttctaga ggatccaagc ttacgtacgc gtgcatgcna 120
cgtcatagct cttctatagt gtcacctaaa ttcaattcac tggccgtcgt tttacaacgt 180
cgtgactggg aaaaccctgg cgttacccaa cttaatcgcc ttgcagcaca tccccctttc 240
gccagctggc gtaatagcna anaggcccgc accgatcgcc cttcccaaca gttgcgcanc 300
ctgaatggcn aatgggacgc gccctgnann ggcgcattaa gcgcggcggn tgaggtggtt 360
acgcncagcg tgaccgctac acttgccagt gccctagcgn ccgctccttt cgctttcttc 420
cctncctttc tcgccangtt cgccggcttt ccccgtcaag ctctaaatcg gggctccct 480
ttagggttcc gatttagtgc tttacggnac cttcgacccc aaaaaanttg attanggtga 540
tggttcacgt aantgggcca tcgcccttga tagacnggtt tttc 584

<210> 313
<211> 763
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (52)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (54)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (264)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (331)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (372)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (431)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (496)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (528)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (530)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (588)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (641)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (657)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (676)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (714)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (730)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (731)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (744)
<223> n equals a,t,g, or c

<400> 313
gaaaaaaaaa nnaaaaaaaa aaaaaaaaaa aaaaaaaaaa aagggcggcc gntntagagg 60
atccaagctt acgtacgcgt gcatgcgacg tcatagctct tctatagtgt cacctaaatt 120
caattcactg gccgtcgttt tacaacgtcg tgactgggaa aaccctggcg ttacccaact 180
taatcgcctt gcagcacatc ccccttttcgc cagctggcgt aatagcgaag aggcccgcac 240
cgatcgccct tcccaacagt tgcncagcct gaatggcgaa tgggacgcgc cctgtancgg 300
cgcattaagc gcggcgggtg tggtggttac ncgcagcgtg accgttacac ttgccagcgc 360
cctagcgccc gntcctttcg ctttcttccc ttcctttctc gccacgttcg ccggctttcc 420
ccgtcaagct ntaaatcggg ggctcccttt agggttccga tttagtgctt tacggcacct 480
cgaccccaaa aaactngatt agggtgatgg ttcacgtagt gggccatngn cctgatagac 540
ggtttttcgc cctttgacgt tggagtccac gttcttaata gtggactntt gttccaaact 600
ggaacaacac ttaaccctat ctcgggctat tcttttgatt nataagggat ttttccnatt 660
tcgggcctat tggttnaaaa aatgaagctt gttttaacaa aaaatttaac gcgnaatttt 720
accaaaaatn nttaaacggc ttanaattta aggggggggcc ctt 763

<210> 314
<211> 761
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (103)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (109)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (119)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (155)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (225)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (248)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (251)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (255)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (257)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (345)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (367)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (371)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (386)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (441)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (447)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (460)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (467)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (483)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (510)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (526)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (527)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (528)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (535)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (545)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (557)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (567)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (581)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (596)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (611)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (632)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (644)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (651)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (653)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (657)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (660)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (664)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (675)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (678)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (692)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (723)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (744)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (756)
<223> n equals a,t,g, or c

<400> 314
gcccacgcgt ccgcccacgc gtccgaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 60
aaaaaaaaaa aagggnggcc gctctaaagg atccaagctt acntacgcnt gcatgcaang 120
tcatanctct cctatagtgt cacctaaatt caatncactg gccgtcgttt tacaacgtcg 180
tgactgggaa aaccctggcg ttacccaact taatcgcctt gcaanacatc ccccttcgc 240
cagctggngt natancnaaa aggcccgcac cgatcgccct tcccaacagt tgcgcancct 300
gaatggcaaa tgggacgcgc cctgttacgg cgcattaanc ccggngggtg tggtggttac 360
ccccaangtt naccgctaca cttgcnagcg ccctagngcc cgctcctttc gctttcttcc 420
cttcctttct cgccaanttc ngccggnttt ccccgtcaan ctctaantcg gggggccctt 480
tanggttcca atttatgctt tacggcaccn caacccaaaa aacttnnnta aggtnatggt 540
ccacntatgg gccatcncct aataaanggt tttccccctt ngaaattgga atccanttct 600
taaaagggaa nctgttccaa atggaaaaaa anccaaccct atcncgggct ntncctngan 660
ttanaaaggg aattnggnca attccggcct antgggttta aaaaattgaa actgaattta 720
aanaaaaatt taaacgcaaa attntaaaaa aaattnttta a 761

<210> 315
<211> 540
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (46)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (109)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (252)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (367)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (422)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (432)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (478)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (488)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (504)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (528)
<223> n equals a,t,g, or c

<400> 315
gatttttat aaaccacggt tgcagccaaa aaaaaaaaan aaaaannaaa aaaaaaaaaa 60
aaaagggcgg ccgctctaga ggatccaagc ttacgtacgc gtgcatgcna cgtcatagct 120
cttctatagt gtcacctaaa ttcaattcac tggccgtcgt tttacaacgt cgtgactggg 180
aaaaccctgg cgttacccaa cttaatcgcc ttgcagcaca tccccctttc gccagctggc 240
gtaatagcga anaggcccgc accgatcgcc cttcccaaca gttgcgcagc ctgaatggcg 300
aatgggacgc gccctgtagc ggcgcattaa gcgcggcggg tgtggtggtt acgcgcagcg 360
tgaccgntac acttgnaagc gccctaacgc ccgntccttt cgctttcttc ccttcctttc 420
tnccacgttc gnccggtttc ccgtcaagct ctaaatcggg ggctccttta agggtccnaa 480
ttantggntt tacgggacct tgancccaaa aaaacttgat ttaggggnga agggttcacg 540

<210> 316
<211> 513
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (265)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (420)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (468)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (478)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (483)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (496)
<223> n equals a,t,g, or c

<400> 316
gtctttctgt taatttccct ctgcctaaag actacatgac agaaatgacc tatcactact 60
tattatttct gaagcctaac tgcaagactg atttctgaga acaagtaaag aactggaata 120
cttatttttc atataaaaat ctaaatgtgt taataaatca tttcatacaa aagtacatta 180
ttaaataacc acattattaa aataaaaaaa aaaaaaaaag ggcggccgct ctagaggatc 240
ccaagcttac gtacgcgtgc atgcnacgtc atagctcttc tatagtgtca cctaaattca 300
attcactggg ccgtcgtttt acaacgtcgg tgactgggaa aaccctggcg ttacccaact 360
taatccgcct tgcagcacat ccccctttcg ccagctggcg taatagcgaa gaggcccgcn 420
ccgatcgccc ttcccaacag ttgcgcatgc tgaatggcga atgggacncg ccctgtancg 480
ggngcattaa agcgcngcgg gtgtggtggt tac 513

<210> 317
<211> 389
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (60)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (70)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (72)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (75)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (111)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (248)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (282)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (342)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (357)

<223> n equals a,t,g, or c

<400> 317
gcccacgcnt ccgaaaaaaa aaaaaaaaaa naaaaaaaaa aaaaaaaaaa aaaaaaaaan 60
gggcggccgn tntanaggat ccaagcttac gtacgcgtgc atgcnacgtc ntagctcttc 120
tatagngtca cctaaattca attcactggc cgtcgtttta caacgtcgtg actgggaaaa 180
ccctggcgtt acccaactta atcgccttgc agcacatccc cctttcgcca gctggcgtaa 240
tagcgaanag gcccgcaccg atcgcccttc ccaacagttg cncagcctga atggcnaatg 300
ggacgcgccc tgtagcggcg cattaagcgc ggcgggtgtg gnggttacnc ncagcgngac 360
cgttacactt gccagcgccc tagcgcccg 389

<210> 318
<211> 388
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (143)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (144)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (146)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (150)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (154)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (160)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (163)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (168)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (171)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (174)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (196)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (198)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (223)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (226)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (227)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (234)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (240)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (242)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (255)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (280)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (314)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (359)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (377)
<223> n equals a,t,g, or c

<400> 318
nnnatctctc tggnggaccc aatttacata ggaaacagct atgaccatga ttacgccaag 60
ctctaatacg actcactata gggaaagctg gtacgcctgc aggtaccggt ccggaattcc 120
cgggtcgacc cacgcgtccg gtnnanaccn atgnggggnn agntctcngg nggnaaggaa 180
aatcgtgcaa agaggnanta atgaatgtgg atcacgagga tanccnntta gtgnaggaan 240
tncatcgttt gggtntaaaa aatgctgatg gaaagttaan tgtgaaaatt ggggtcctct 300
ttcgtgatga taantgagcc aacctctttg aagcattggt aggaactctt aaagctgtna 360
aacgananaa gaatgtncat atccagga 388

<210> 319
<211> 418
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (235)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (240)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (285)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (380)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (391)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (392)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (396)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (401)
<223> n equals a,t,g, or c

<400> 319
gatatttgtt acttttagtt ctataagtga ggaagagttt atggcaaaga tttttggcac 60
tttgttttca agatggtgtt atcttttgaa ttcttgataa atgactgttt ttttctgcct 120
aatagtaact ggttaaaaaa caaatgttca tatttattga ttaaaaatgt ggttgcttaa 180
ttcctaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaagggcg gccgntctan 240
aggatccaag cttacgtacg cgtgcatgcg acgtcatagc tcttntatag tgtcacctaa 300
attcaattca ctggccgtcg ttttacaacg tcgtgactgg gaaaaccctg gcgttaccca 360
acttaatcgc cttgcagcan atccccctttt nnccanctgg ngaataccaa aaggcccg 418

<210> 320
<211> 684
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (251)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (570)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (594)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (596)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (606)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (670)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (684)
<223> n equals a,t,g, or c

<400> 320
cgggaaattc ncaaagctgt ttccgcctgc aggtcccggt ncggaattcc cgggtcgacc 60
cacgcgtccg natccccagt gtgaggttaa tgagcaaaat tggtctttgg ggcccttttt 120
gtccaagccc cactgaaagg cctcttcaga aaactattat ctttaaagcc ctactttaac 180
tccttaattc cagcatacag ctaaaactgg atgtatattc tggcaagtaa aggctgagga 240
ctcctcttta ntcctcagat ctagataact catgacattt tatttgacca acatagcaca 300
tgatgagata tcaaggtaat taaaatagca tgcttgaaaa aaaatacgta atctgtttca 360
cctgtaactg tttaagccaa taaacttttc aaaatttaaa aaaaaaaaaa aagggcggcc 420
gctctagagg atccaagctt acgtacgcgt gcatgcgacg tcatagctct tctatagtgt 480
cacctaaatt caattcactg gccgtcgttt tacaacgtcg tgactgggaa aaccctggcg 540
ttacccaact taatcgcctt gcagcacatn cccctttcgc agctggcgta atancnaaga 600
ggcccnaccg atcgcccttt ccaacagttg cgcagcctga atggcgaatg ggacgcgccc 660
tgtagccggn cattaagcgc cggn 684

<210> 321
<211> 216
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (108)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (155)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (183)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (190)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (192)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (202)
<223> n equals a,t,g, or c

<400> 321
cncnagaccn nctttggaaa cgccngacta tagggaaagc tggtacgcct gcaggtaccg 60
gtccggaatt cccgggtcga cccacgcgtc cgcccggctg gaggctgnca gaaggatgct 120
ggggataagc ccttaggcac cagcttagac acctncaaga accaggcccc gctgatgcaa 180
ganggcagan cngataccca tnagagcccc gagaat 216

<210> 322
<211> 557
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (98)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (415)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (509)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (545)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (546)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (550)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (555)
<223> n equals a,t,g, or c

<400> 322
ggtccagaag cctccccgac cccccaagct atttgctcan attaacaaat taaagtgcct 60
gaagcataat tcatttttgt atctgtggta acaaaacntt aaccaaaaga ttttctgtcc 120
agaagcctcc ccgacccccc aagctatttg ctcacattaa caaattaaag tgcctgaagc 180
ataattcatt ctttacctgt atactaaaaa ccctgttgta ttgatttttt tataataagc 240
ctttttacct ctgtgtaaaa aatatatata caagtgtatg atgtanattt tagttcttaa 300
cttttttta tggtttctaa tatgtatgac caatgtagcc attgctttaa aatgtaccgt 360
gtaaatataa acacatccta tcagaaaaaa aaanaaaaaa gggcggccgc tctanaggat 420
ccaagcttac gtacgcgtgc atgcgacgtc atagctcttc tatagtgtca cctaaattca 480
attcactggc cgtcgtttta caacgtcgng actgggaaaa accctgggcg ttacccaact 540
taatnnggcn ttgcngg 557

<210> 323
<211> 145
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (15)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (56)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (139)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (140)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (142)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (145)
<223> n equals a,t,g, or c

<400> 323
ggtancngca gtacngtcng aattcccggc tctagagatc caagcttacg tactgngcat 60
gcacgtcata gctcttctat agtgtcacct aaattcaatt cactggccgt cgttttacaa 120
cgtcgtgact gggaaaacnn tntan 145

<210> 324
<211> 353
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (133)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (146)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (216)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (219)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (225)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (232)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (235)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (263)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (334)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (353)
<223> n equals a,t,g, or c

<400> 324
nnnattcatc atagccacca tcaccctnct taacctctac ttntacctac gcctaatcta 60
ctccacctca atcacactac tccccatatc tagcaacgta aaaataaaan gacagtttga 120
acatacaaaa ccnaccccat tcctcnccac actcatcgcc cttaccacgc tactcctacc 180
tatctccccc tttatactaa taatcttata aaaaanaana aaaangggcg gncgntctag 240
aggatccaag cttacgtacg cgngcatgcg acgtcatagc tcttctatag ggtcacctaa 300
attcaattca ctggccgtcg ttttacaacg tngngactgg gaaaacccng gcn 353

<210> 325
<211> 553
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (359)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (381)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (406)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (448)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (461)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (481)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (513)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (524)
<223> n equals a,t,g, or c

<400> 325
ggcacgagga caaagccttg ctctgttccc caggctggag tgcattggtg caatcatggc 60
tcactgcagt ctcaaccttc cggactcaag tgatggtccc gcttcagcta cttgggaggc 120
tgaggcagga gaatcgcttg aacccgggag gcggaggttg cggggagccg ggattgtgcc 180
actgcactcc accctagagt gagactccct ctcaaaaaaa aaaaaaaaaa actcgagggg 240
gggcccggta cccaattcgc cctatagtga gtcgtattac aattccactg gccgtcgttt 300
tacaacgtcg tgactgggaa aaccctgggc gttacccaac ttaatcgcct ttgcagcana 360
tcccctttcg ccagctgggt naattagcga agaggcccgc accgantcgc ccttcccaaca 420
gttgcgcagt ggaatggcga atggcaantg taagcttaaa ntttgtttaa aattcgcgtt 480
naaatttttg gttaaatcag ctcatttttt aancataagg ccgnaatcgg gaaaatccct 540
tattaaatcc aaa 553

<210> 326
<211> 628
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (434)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (464)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (592)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (602)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (613)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (622)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (625)
<223> n equals a,t,g, or c

<400> 326
gcntgcntcc aagtccatag gtcctgcctc ttcaatcctg gctttctagg gcctgggatg 60
atcattgcta gaactgagag accagcctgg ctagaacttc agggcgttcc attcattctt 120
tcagtaaatg tttgcagcac atgtgttaca tgtcaggcag tgaaaccccc cacagcagcc 180
ttccctctca gaggatacat ttgtaaccat tacacagtca tcagaggaat aatttttttt 240
aatcaccagt gtgcacacag tcatggagtt gggtattccc agctaccagg gaggctgagg 300
tgggaggatt gcttgatgcc aggagttagg gaatatagtg caccgtgatt ggacttgcga 360
atagccactg cactgcggcc tggacgacgt agtgataccc tgactcttat aaataaataa 420

atgaataaac acannanaaa aaaaaaaggg cggccgctct agangatcca agcttacgta 480
cgccgtgcat gcgacgtcat aactcttcta taggggcacc taaattcaat tcactggccc 540
gccgtttaca acgtctgact gggaaaaccc tggcgttacc caacttaatc gncttgcaga 600
anatcccctt ttnccaactg gnggnata 628

<210> 327
<211> 416
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (22)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (254)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (258)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (260)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (265)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (285)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (299)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (300)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (305)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (334)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (416)
<223> n equals a,t,g, or c

<400> 327
gatgactgat gttattatac antatggtaa atacaaagtt gtagtattat ggttcttgat 60
ggtgtgattt acttatgtaa attatgtaca aatttaagtt caatgaaaca ctgatttaat 120
gtactgaaag gtaaatagta ccatagtgaa ttattttctg tcttgcctta ggtttatttt 180
tattatcttc aatattagaa taaatgctaa attattttca aaaaaaaaaa aaaaaaaaaa 240
aaaaaaaaaa gggnggangn tctanaggat ccaagcttac gtacncgtgc atgcaangnn 300
atagntcttc tatagtgtca cctaaattca attnactggc cgtcgattna caacgtcgtg 360
actgggaaaa ccctggcgtt acccaactta atcgccttgc agcacatccc cctttn 416

<210> 328
<211> 629
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (227)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (228)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (229)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (242)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (243)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (244)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (257)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (271)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (275)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (284)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (301)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (512)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (544)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (554)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (573)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (598)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (619)
<223> n equals a,t,g, or c

<400> 328
ttttttttt ttttttcggc gctgccgtat cgttccgcct gggcgggatt ctgacttaga 60
ggcgttcagt cataatccca cagatggtag cttcgcccca ttggctcctc agccaagcac 120
atacaccaaa tgtctgaacc tgcggttcct ctcgtactga gcaggattac catggcaaca 180
acacatcatc agtagggtaa aactaacctg tctcacgacg gtctaannna aanaaaaaaa 240
annnaaaaaa gaattcnaaa agcttctcga nagtncttct aaancggccg cgggcccatc 300
nattttccac ccgggtgggg taccaggtaa gtgtacccaa ttcgccctat agtgagtcgt 360
attacaattc actggccgtc gttttacaac gtcntgactg ggaaaaccct ggcgttaccc 420
aacttaatcg ccttgcagca catccccctt tcgccagctg gcgtaatanc gaaaaaggcc 480
gcancgatcg cccttcccaa cagtttgcgc ancctgaaat ggcgaatgga aatcaatttt 540

taantgttta atgntgttaa actactgaat ccnaattgtt tggtgttttt taaaatcnca 600
gtcccaaggg tcatttcang gccctcaat 629

<210> 329
<211> 458
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (20)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (86)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (96)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (194)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (226)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (238)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (267)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (277)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (280)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (285)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (295)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (346)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (352)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (356)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (372)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (380)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (452)
<223> n equals a,t,g, or c

<400> 329
```
aatntaaaaa aaaaaaaaan aaaaaaaaaa naaaaaaaaa agggcggccg ctctaaagga 60
tccaagctta cgtacgcgtg catgcnacgt catagntctg ctatagtgtc acctaaattc 120
aattcactgg ccgtcgtttt acaacgtcgt gactgggaaa accctggcgt tacccaactt 180
aatcgccttg cagnacatcc ccctttcgcc agatggcgta atagcnaaaa ggcccgcncc 240
gatcgccctt cccaacagtt gngcagnctg aatggcnaan gggangcgcc ctgtngcggc 300
gcattaagcg cggcgggtgt ggtggttacg cnnagggtna ccgctncact tnccancgcc 360
ctagcgcccg gncctttcgn tttcttccct tcctttctcg ccacnttcgc cggntttccc 420
cgtcaagctc taaatcgggg ggtccctttt anggttcc                         458
```

<210> 330
<211> 453
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (78)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (83)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (113)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (134)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (323)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (327)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (391)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (418)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (427)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (428)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (453)
<223> n equals a,t,g, or c

<400> 330

gcccctatac cttctgcata atgaattaac aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 60
aaaaaaaagg gcggccgntc tanaggatcc aagcttacgt acgcgtgcat gcnacgtcat 120
agctcttcta tagngtcacc taaattcaat tcactggccg tcgttttaca acgtcgtgac 180
tgggaaaacc ctggcgttac ccaacttaat cgccttgcag cacatccccc tttcgccagc 240
tggcgtaata gcgaaaaggc ccgcaccgat cgcccttccc aacagttgcg cagcctgaat 300
ggcgaatggg acgcgccctg tancggngca ttaagcgcgg cgggtgtggt ggttacgcgc 360
agcgtgaccg ttacacttgc cagcgcccta ncgcccgctc ctttcgtttc ttcccttnct 420
ttctcgnnac gttcgccggt ttccccgtta agn 453

<210> 331
<211> 498
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (356)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (361)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (381)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (393)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (433)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (452)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (469)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (483)
<223> n equals a,t,g, or c

<400> 331
gagaaagctg actaatccaa agggcaaggt ggtttacctt aaagaaaaaa aaaaaaaaag 60
ggcggccgct ctagaggatc caagcttacg tacgcgtgca tgcgacgtca tagctcttct 120
atagtgtcac ctaaattcaa ttcactggcc gtcgttttac aacgtcgtga ctgggaaaac 180
cctggcgtta cccaacttaa tcgccttgca gcacatcccc ctttcgccag ctggcgtaat 240
agcgaagagg cccgcaccga tcgcccttcc caacagttgc gcagcctgaa tggcgaatgg 300
gacgcgccct gtacggcgca ttaagcgcgg cgggtgtggt ggttacgccc agcgtnaccg 360
ntacacttgc cagcgcccta ncgccccgct ccntttcgct ttctttccct ttcctttctt 420
tggncacgtt tcnccgggtt tttccccccgt tnaaagcctt ttaaaatcng gggggggcttc 480
ccntttaaag gggttccc 498

<210> 332
<211> 450
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (278)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (317)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (328)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (335)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (338)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (347)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (353)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (358)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (373)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (374)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (377)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (386)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (392)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (395)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (415)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (417)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (426)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (428)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (430)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<400> 332
aattcggcag aggtactcct ggcttatcaa tggaacattc cagcaaagca cacaagagct 60
ctttatccct aacatcactg tgaataatag tggatcctat acctgccacg ccaataactc 120
agtcactggc tgcaacaggg ccacagtcaa gacgatgcat agtcactgag ctaagtccag 180
tagtagcaaa gccccaaatc aaagccagca agaccacagt cacaggagat taaggactct 240
gtggaacctg gacctggttc cacaaaatgg acactggnat cttccatccc gttggttctt 300
tcaaaaaacc aggggtnttc ccgtcctngg ggggnttnga aggtttntcc ccnggggnaa 360
aaaaccancc ttnnggnntt aaancncttt tnaangnggg ggggtttttt gggangngtt 420
ttgggntntn ggggttttta aacccntttg 450

<210> 333
<211> 434
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (58)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (119)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (195)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (214)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (218)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (269)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (291)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (316)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (337)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (399)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (425)
<223> n equals a,t,g, or c

<400> 333
gntgaacgta aactataatg ctctaccaca agaaaatggc ctctcacctg gggccatngc 60
tggcattgtg attggagtag tggccctggt tgctctgata gcagtagccc tggcatgtnt 120
tctgcatttc gggaagaccg gcagctcagg accactccaa tgacccacct aacaagatga 180
atgaagttac ttatnctacc ctgaactttg aagnccanca acccacacaa ccaacttcag 240
cctccccatc cctaacagcc acagaaatna tttattccag aagtaaaaaa ncagtnatga 300
aacctggtcc tgctcnctgc agtgcctgat gtntttncaa gtctctcacc ccccatcact 360
aggaaattcc tttcccctgt tngggtaaag ggtggggana gaaancaatt tctcctactc 420
tcctncctat agga 434

<210> 334
<211> 612
<212> DNA
<213> Homo sapiens

<220>

<221> misc feature
<222> (365)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (455)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (474)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (482)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (493)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (497)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (525)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (540)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (565)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (583)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (606)
<223> n equals a,t,g, or c

<400> 334
ggtctagcca caacagggtc aatgctcgcc ttgcaggtgc ccccagcgag gacccccagt 60
tccccaaggt gcagtggcca ccccgtgaac tttgttctgc ctgccacaat gaacgcctgg 120
atgtgcccgt gtgggacgtg gaagccaccc tcaacttcct caaggcccac ttctccccaa 180
gcaacatcat cctggacttc cctgcagctg ggtcaacttg cccgagggat gtgcagaatg 240
tggcaagccg ccccaaactg gcgatgggag ccctggagct ggaaagccgg aattcaactc 300
tggaccctgg gaagcctgag atgatgaagt cccccacaaa caccacccca catgtgccgg 360
ctganggacc tgaggcaagt cgacccccga agcttgcacc ctggcctaaa acttgaccag 420
gccaggaacc ctctgancac aatggcaaaa gcttnaaagg aatgaaccag gaancaagcc 480
gntttgggca atngggnact ttgagccaaa gccgaagaac accanggggc ttggatttgn 540
tttggcttta atttccaagg ggttnaaaaa aaaaaacccg gcnttttttg gggggccccc 600
tttttnggaa gg 612

<210> 335
<211> 462
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (287)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (337)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (358)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (373)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (428)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (456)
<223> n equals a,t,g, or c

<400> 335
gcccacgcgt ccgcatgttt ccaggagggg ccatgggggt cagggtggtt ttgagagagc 60
agggtaagga aggaatgtgc tagaagtgct cctagtttct tgtaaaggaa gccagagttg 120
acagtacaaa gggtcgtggc cagccctgca gcttcagcac ctgccccacc cagagtggga 180
gtcaggtgga gccacctgct gggctccccc agaactttgc acacatcttg ctatgtatta 240
gccgatgtct ttagtgttga gcctctggat tctggggtct gggccantgg ccatagtgaa 300
acctgggaat gaatggtact tgaacatctg ggcttgncag ccacaaggaa aggccaancc 360
catgtacccc aancattctt gccaaccctt gctctgggca ttcccggaag ggtcgatcct 420
taggcttngc tttaaaagcc cttgcccttg cctttntctt gg 462

<210> 336
<211> 336
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (170)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (175)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (177)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (183)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (196)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (204)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (208)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (230)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (275)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (293)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (318)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (335)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (336)
<223> n equals a,t,g, or c

<400> 336
gcagattttg atcgttttaa agttatgaag gcaaagaaaa tgaggaacag aataatcaag 60
aatgaattaa gaagcttcaa aaggcagctc tcctgaaagc ttctcccaaa aaacacctgg 120
tactaagggt actgctgctg ctgctgctgc tgctgctgct gctgctaaan tccancnaaa 180
aanatcaccg cccganttaa aagntccncc caaaagtcct gcccaaaaan cccaggccaa 240
aaacacgctg ctccaaactc anaggtcaaa actcncccaa aaccctctcc aangctctgc 300
aaaaagctta ttgcatcnta aaattataag gtctnn 336

<210> 337
<211> 303
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (37)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (49)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (50)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (64)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (66)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (67)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (70)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (120)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (168)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (189)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (190)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (192)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (223)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (249)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (256)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (257)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (267)
<223> n equals a,t,g, or c

<400> 337
agacaatcct taccatgtga naggnggnat gactgtnatg gcatgagann ngcatcacta 60
tganannggan aactcagtag aagataatgg caagtccaga ctggggatat gatgacaaan 120
atggtcctga acaatggagc aagctgtatc ccattgccaa tggaaatnac cagtcccctg 180
ttgatattnn gnccagtgaa accaaacatg acacctctct ganacctatt agtgtctcct 240
acaacccanc cacagnnaaa gaaattntcc aatgtggggg cattccttcc atgtaaattt 300
ttg 303

<210> 338
<211> 460
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (409)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (423)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (433)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (454)
<223> n equals a,t,g, or c

<400> 338
gatttaaggc atntcctgca tgcacagttg cagttagtta ttccaggtat tatttttgtt 60
ttcagaaaaa gaaaactcag tagaagataa tggcaagtcc agactgggga tatgatgaca 120
aaaatggtcc tgaacaatgg agcaagctgt atcccattgc caatggaaat aaccagtccc 180
ctgttgatat taaaaccagt gaaaccaaac atgacacctc tctgaaacct attagtgtct 240
cctacaaccc agccacagcc aaagaaatta tcaatgtggg gcattccttc catgtaaatt 300
ttgaggacaa cgatnaccga tcaagtgctg aaaggtggtc ctttctctga cagctcaggc 360
tctttcagtt ccattttcac tggggcagtc aaaatgagca tgggttaana acattccagt 420
ggnntgggag tcnaaatatt ctggccgagc tttnacgtaa 460

<210> 339
<211> 416
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (30)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (33)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (137)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (147)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (161)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (173)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (258)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (267)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (268)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (403)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (407)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (411)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (415)
<223> n equals a,t,g, or c

<400> 339

```
ggtgccgatt cctgccctgc cccgaccgcn agncggacca tntcccatca ntgggggtac 60
ggcaaacaca acggacctaa gcactggcat aaggacttcc ccattgccaa gggaagagcg 120
ccagtncccc tgttganatc gacactncat acagccaagt ntgaaccctt ccntgaaagc 180
ccctgtttgt ttcctatgaa tcaagcaact tccctgagga tcctcaacaa tggtcatgct 240
ttcaacgtgg gagtttgnat gactctnnag gacaaagcag tgcttcaagg gaaggacccc 300
tgggttgggc actttacaga ttggttttca ttttttcaat tttcaatggg ggtttcaatt 360
tgatgggaca aggtttcnga ggcataattg tgggttaaaa agnaatntgg ntgcng     416
```

<210> 340
<211> 362
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (117)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (136)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (170)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (201)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (204)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (310)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (331)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (335)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (338)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (357)
<223> n equals a,t,g, or c

<400> 340
ggcanagtga atgttgctgg agaacaaggc cagcattttt ggaggaggac tgcctgcccc 60
ataccaggtc aaacanttgc acctgcactg gtccgacttg ccatataagg gctcggngca 120
cagcctcgaa tggggngcac tttgccatgg gagatgcaca tagtacatgn gaaaagagaa 180
ggggacatcg aggaatgtga naanagggcc caggaaccct gaagacgaaa ttncggtgct 240
gggccttttt ggtgggaggc tgggaaccca ggtgaaacga gggctttcca gccactggtg 300
ggaggcactn tcttaatatt ccccaaacct nnggntgnng cattacgatt ggcaganagg 360
ca 362

<210> 341
<211> 328
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (63)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (98)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (152)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (171)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (184)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (195)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (276)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (280)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (303)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (311)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<400> 341
aagcctttca agatgatccc cggagtggtg gatggggtct tcctgcccag gcacccccag 60
ganctgctgg cctctgccga ctttcagcct gtccctanca ttgttggtgt caacaacaat 120
gaattcggct ggctcatccc caaggtcatg angatctatg atacccagaa ngaaatggac 180
aganangcct cccangctgc tctgcagaaa atgttaacgc tgctgatttg cctcctacat 240
ttggtgacct gctgaaggaa gaattcattt gggganaatn gggatcccca aaacccccaa 300
acncatttcc nggaaaataa ttgcngaa 328

<210> 342
<211> 140
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (33)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (70)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (73)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (129)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (130)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (140)
<223> n equals a,t,g, or c

<400> 342
aangggactt nccagtgatg cacccaagag ctntttatcc ccaacatcac tgtgaataat 60
aggggatccn atncgtgcca agcccataac tctacactgg ccttaatagg agcacagtca 120
cgaatatcnn agtctatgcn 140

<210> 343
<211> 477
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (396)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (421)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (459)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (463)
<223> n equals a,t,g, or c

<400> 343
gggacagcag agctgacagt cacagcagcc ctgacaagag agttcctgga gcccaagctc 60
ttctccacag aggacaagca ggcagcagag accatggggt cccccttcagc ctgtccatac 120
agagtgtgca ttccctggca ggggctcctg ctcacagcct cgcttttaac cttctggaac 180
ctgccaaaca gtgcccagac caatattgat gtcgtgccgt tcaatgtcgc agaagggaag 240

```
gaggtccttc tagtagtcca taatgagtcc cagaatcttt atggctacaa ctggtacaaa 300
ggggaaaggg tgcatgccaa ctatcgaatt ataggatatt gtaaaaaata taagtcaaga 360
aaatgcccaa ggcccgacac aacgtcgaga gacatntacc caatggaacc ttgtgttcca 420
nacgtaccac atgcncagga tttttcctca ctataaaana aanttggatg agaatac    477
```

<210> 344
<211> 389
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (22)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (32)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (35)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (144)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (145)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (201)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (379)
<223> n equals a,t,g, or c

<400> 344
nnnnnnnnnt ntcgcacgnc nngccagcca ancentcact aaagggaaca aaagctggag 60
ctccaccgcg gtgcgaccgc tctagaacta gtggatcccc cgggctgcag gaattcggca 120
cgaggccggc cggggctggc acgnncgccg cggcggggnc tggaggcgcg accgggcgcc 180
cccgagcggg aatcagaacg ncgccgaggg gaccagatca acgccagcaa gaacgaggag 240
gacgcgggaa aaatgttcgt tggtggcctg agctgggata ctagcaaaaa agatttaaaa 300
gactatttta ctaaatttgg agaggtcgtt gactgtacaa taaaaatgga tcccaacact 360
ggacggtcaa gagggtttng gtttatcct 389

<210> 345
<211> 152
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (34)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (61)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (64)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (84)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (87)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (122)
<223> n equals a,t,g, or c

<400> 345
tcgacccacg ngtccggggc gcaccatggc ccgnggggct gngctggngc tgctgctctt 60
nggnctgctg ggtgttctgg tcgncgnccc ggatggtggt ttcgatttat ccgatgccct 120
tnctgacaat gaaaacaaga aacccactgc aa 152

<210> 346
<211> 634
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (32)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (38)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (284)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (491)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (586)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (588)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (598)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (613)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (621)
<223> n equals a,t,g, or c

<400> 346
tntgtctgaa tgtaaatcac cttctgagcc gntgattncc aagagggttg gtcttattca 60
catatcccaa gtcatctcag aaattgatgg taacaggatg accttgagcc aagaaggagc 120
acaagattcc ttccctcttc agcagaagat cttggtttgc tctttgatgc tcttgatcag 180
gcagttgaaa atcaaagagg tcactctggg gaagttatat gaagcctaca gtaaagtctg 240
tcgcaaacag caggtggcgg ctgtggacca gtcagagtgt ttgncacttt cagggctctt 300
ggaagccagg ggcattttag gattaaagag aaacaaggaa acccgtttga caaaggtgtt 360
tttcaagatt gaagagaaag aaatagaaca tgctctgaaa gataaagctt taattggaaa 420
tatcttagct actggattgc cttaaattct tctcttacac cccacccgaa agtattcaag 480
ctggcattta nagagctaca ggcttcattt taaggcttta cacattcggg cctgaaaaca 540
aatatgacct tttttacttg aagccaatga attttaatct atagancntt aaaattanca 600
cagaataata tcnttggggc ntactatttt accc 634

<210> 347
<211> 363
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (228)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (242)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (268)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (319)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (322)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (323)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (328)
<223> n equals a,t,g, or c

<400> 347
ggcacgagag gaatatggag aggctgactc ttgcttgtgg tggggtggcc ctgaattctt 60
ttgaggacct aagtcctgac tgcttgggac atgcaggact tgtatatgag tatacattgg 120
gagaagttca cctttattga gaagtgtaac aaccctcgtt ctatcacatt attgatcaaa 180
ggaccaaata agcccacact tagatcaaag atgcagtaaa gggatggnct tgnagggctg 240
tncaaaaatg ctgttgatga tggctgtntg gttccgggtg ctggtgctgt ggaagtggca 300
atggcagaag ccctggatna annnnaantc catgtaaagg gcaaggcaca gttggggtcc 360
agc 363

<210> 348
<211> 388
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (205)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)
<223> n equals a,t,g, or c

<400> 348
aattcggcac gagctgaagg ctagcaaacc gagcgatcat gtcgcacaaa caaatttact 60
attcggacaa atacgacgac gaggagtttg agtatcggtt agtgctggcg cgggagcaat 120
agcgagggtc gtgagctttg gccgctgagg gcacaaggaa ttagtaacag gaactgaggc 180
gatagaattg gcgcatgcgt atganacatg tcatgctgcc caaggacata gccaagctgg 240
tccctaaaac ccatctgatg tctgaatctg aatggaggaa tcttggcgtt cagcagagtc 300
agggatgggt ccattatatg atccatgaac cagaacctna aatnttgctg ttccggggcc 360
attnccagga accaaggaat tnagtttc 388

<210> 349
<211> 194
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (38)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (57)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (60)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (67)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (69)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (74)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (83)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (91)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (124)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (127)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (140)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (180)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (191)
<223> n equals a,t,g, or c

<400> 349
gagttgttgc ctgggctgga cgtggttttg tctgctgngc ccgctcttag ngctctngtn 60
taatttnang cagngcgcca gcnggatggt ncacaagcag atatactact cggacaagta 120
cttngangaa cactacgagn accgggatgg tatgttaccc agagaacttg acaaacaagn 180
acctaaaact natc 194

<210> 350
<211> 524
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (85)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (98)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (101)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (148)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (240)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (258)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<400> 350
ttaaccttnt naanggnaca aagtctggnt ctccaccagg tggaggaccg ctcctagcaa 60
ctagtgggtc ccccgggcct gcagnaattc ggcagtgncg naaagcccta cggcgtcact 120
gcaatgtgct ggaactggga gcaagtgnca gcggctggac ggcatcctga gtcgagacca 180
ttccgattca cgggcgcggc aacttcccca cgctcgagct gcagccgagc ctgtatcgtn 240
aaggtggtgc ggcggcgnct tgccgagaag cgcatcggcg tccgcgacgt gcgcctcaac 300
ggctcggcag ccagccatgt cctgcaccag gacagcggcc tgggctacaa ggacctggac 360
ctcatcttct gcgccgacct gcgcggggaa ggggagtttc agactgtgaa ggacgtcgtg 420
ctggactgcc tgttggactt cttaccccgag gggtgaaca aagagaagat cacaccactc 480
acgntcaagg aagcttatgt gcagaaaatg gttaaagtgt gcaa 524

<210> 351
<211> 352
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (261)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (291)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (295)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (328)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<400> 351
gccaaatcct ttgaatactg ngccaggatt tttaagcaac actttatgga cagcagaata 60
ccttgcttaa tcgtagctgc aaagtcagac ctgcatgaag ttaaacaaga atacagtatt 120
tcacctactg atttctgcag gaaacacaaa atgcctccac cacaagcctt cacttgcaat 180
actgctgatg cccccagtaa ggatatcttt ggtaaattga caacaatggc catgtatccc 240
catgcccggt tacgctgtat ntgcacctgc aacaggtgta cattttgcat ntgtnaaaac 300
ttcctcaact tatactttgc tgcaaatntg gtaaaagaac aaaaatcntt tc 352

<210> 352
<211> 632
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<400> 352
agnnaganac caaccctcac taaagggaac aaaagctgga gctccaccgc ggtgcggccg 60
ctctagaact agtggatccc ccgggctgca ggaattcggc acgaggtgtg tcagaacaat 120
cttgaatcat gaagctacta accagagccg gctctttctc gagattttat tccctcaaag 180
ttgcccccaa agttaaagcc acagctgcgc ctgcaggagc accgccacaa cctcaggacc 240
ttgagtttac caagttacca aatggcttgg tgattgcttc tttggaaaac tattctcctg 300
tatcaagaat tggtttgttc attaaagcag gcagtagata tgaggacttc agcaatttag 360
gaaccaccca tttgctgcgt cttacatcca gtctgacgac aaaaggagct tcatctttca 420
agataacccg tggaattgaa gcagttggtg gcaaattaag tgtgaccgca acaagggaaa 480
acatggctta tactgtggaa tgcctgcggg gtgatgttga tattctaatg gagttcctgc 540
tcaatgtcac cacagcacca gaatttcgtc gttgggaagt agctgacctt cagcctcagc 600
taaagattga caaagctgtg gcctttcaga at 632

<210> 353
<211> 440
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<400> 353
ctttaactcc accattagca cccaaagcta agattctaat ttaaactatt ctctgttctt 60
tcatggggaa gcagatttgg gtaccaccca agtattgact cacccatcaa caaccgctat 120
gtatttcgta cattactgcc agccaccatg aatattgtac ggtaccataa atacttgacc 180
acctgtagta cataaaaacc caatccacat caaaaccccc tccccatgct tacaagcaag 240
tacagcaatc aaccctcaac tatcacacat caactgcaac tccaaagcca cccctcaccc 300
actaggatac caacaaacct acccaccctt aacagtacat agtacataaa gccatttacc 360
gtacatagca cattacagtc aaatcccttc tcgtccccat ggatgacccc cctcagatag 420
gggtcccttg accancatcc 440

<210> 354
<211> 609
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (139)
<223> n equals a,t,g, or c

<400> 354
aancnganac naaccctcac taaagggaac aaaagctgga gctccaccgc ggtgcggccg 60
ctctagaact agtggatccc ccgggctgca ggaattcggc acgagccgga gggtgtgtgt 120
tgggcaaagc cggaggagna ggaggacgat tgttttacgg atcccgtgat cggcccgtcc 180
ttctcccctt tcccccctcc ctaccgcccc tgtcccgccg gggagcggcg gcggccttgg 240
actttgctgt ctttcctcgc ggagacagat ttcaacacta cacttgcaca atgtctttga 300
aaccaagagt agtagatttt gatgaaacat ggaacaaact tttgacgaca ataaaagccg 360
tggtcatgtt ggaatacgtc gaaagagcaa catggaatga ccgtttctca gatatctatg 420
ctttatgtgt ggcctatcct gaacccсttg gagaaagact ttatacagaa actaagattt 480
ttttggaaaa tcatgttcgg catttgcata agagagtttt ggagtcagaa gaacaagtac 540
ttgttatgta tcataggtac tgggaagaat acagcaaggg tgcagactat atggactgct 600
tatataggt 609

<210> 355
<211> 466
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (450)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (451)
<223> n equals a,t,g, or c

<400> 355
gctccattat tgatcggttc atgcagaata attgtgtgcc caagaagatg ctgcagctgg 60
ttggtgtcac tgccatgttt attgcaagca aatatgaaga aatgtaccct ccagaaattg 120
gtgactttgc ttttgtgact gacaacactt atactaagca ccaaatcaga cagatggaaa 180
tgaagattct aagagcttta aactttggtc tgggtcggcc tctacctttg cacttccttc 240
ggagagcatc taagattgga gaggttgatg tcgagcagca tactttggcc aaatacctga 300
tggaactaac tatgttggac tatgacatgg tgcactttcc tccttctnaa attgcagcag 360
gagctttntg cttagcactg aaaattctgg gataatggtg aatggttatg cagcacctgg 420
ctaagaatgt agtcatgggt aaatcaaggn nttacaaagc acatgc 466

<210> 356
<211> 447
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (269)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (375)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (380)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (436)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<400> 356
ggtgatgagg aggcttgtcc agaggacaag ggaccccagg acccacaggc actggcgctg 60
gacacccaga tccctgcaac ccctggaccc aaacccctgg tccgcaccag ccgggagcca 120

gggaaggacg tcacgacctc agggtactcc tccgtcagca ccgcaagtcc cacaagctcc 180
gtggacggtg gcttgggggc cctgccccaa cctacctcag tgctgtccct ggacagtgac 240
tcgcacacac agccctgcca ccatcaggnc aggaagtcat gtttacagtg tcgtccccca 300
agtcccccgg agagcagtgt tccccagcaa caggtgaagc ggataaacta tgcatacaca 360
gtgaagagga ggacntgaan ctgggcttgt gaagctgtaa gtgtgtcagc acatttgcgc 420
agtggatttt actgangggn tgaagng 447

<210> 357
<211> 510
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (453)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (486)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (491)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (496)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (500)
<223> n equals a,t,g, or c

<400> 357
tnccacgcgt ccgcccacgc gtccgcccac gcgtccgcag attccctccg tcgccgccaa 60
gatgatgtgc ggggcgccct ccgccacgca gccggccacc gccgagaccc agcacatcgc 120
cgaccaggtg aggtcccagc ttgaagagaa agaaaacaag aagttccctg tgtttaaggc 180
cgtgtcattc aagagccagg tggtcgcggg gacaaactac ttcatcaagg tgcacgtcgg 240
cgacgaggac ttcgtacacc tgcgagtgtt ccaatctctc cctcatgaaa acaagccctt 300
gaccttatct aactaccaga ccaacaaagc caagcatgat gagctgacct atttctgatc 360
ctgactttgg acaaggccct tcagccagaa gactgacaaa gtcatcctcc gtctaccaga 420
gcgtgcactt gtgatcctaa aataagcttc atntccgggc tgtgcccctt ggggtggaag 480

gggcangatt ntgcanctgn ttttgcattt 510

<210> 358
<211> 240
<212> DNA
<213> Homo sapiens

<400> 358
ggtcttgcac tcatgagctg tccccacatt aggcttaaaa acagatgcaa ttcccggacg 60
tctaaaccaa accactttca ccgctacacg accgggggta tactacggtc aatgctctga 120
aatctgtgga gcaaaccaca gtttcatgcc catcgtccta gaattaattc ccctaaaaat 180
ctttgaaata gggcccgtat ttaccctata gcaccccctc tacctcctct agagccaaaa 240

<210> 359
<211> 340
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (320)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (331)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (334)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (335)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (338)
<223> n equals a,t,g, or c

<400> 359
ggcacgagct cataaggaaa tctaccccta tgtcatccag gaacttagac caactttaaa 60
tgaactggga atctccactc cggaggaact gggccttgac aaagtgtaaa ccgcatggat 120
gggcttcccc aaggatttat tgacattgct acttgagtgt gaacagttac ctggaaatac 180
tgatgataac atattacctt atttgaacaa gttttccttt attgagtacc aagccatgta 240
atggtaactt ggactttaat aaaaaggaaa tgagtttgaa ccggaaaaaa aaaaaaaaaa 300
aaaaaaaaaa aaaagaaaan aaagaaggga nagnnaanaa 340

<210> 360
<211> 501
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (147)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (148)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (192)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (242)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (244)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (455)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (465)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (474)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (491)
<223> n equals a,t,g, or c

<400> 360
cccacgcgtc cgcccacgcg tccgatgcct atcatatagt aaaacccagc ccatgacccc 60
taacaggggc cctctcagcc ctcctaatga cctccggcct agccatgtga tttcacttcc 120
actccataaa gctcctcata ctaaggnnta ctaaccaaca cactaaccat ataccaatga 180
tggcgcgatg tnacacgaag aaagcacata ccaagggcac cacacaccac ctgtccaaaa 240
angncttcga tacgggataa tcctatttat tacctcagaa gttttttttct tcgcaggatt 300
ttctgagctt ttacactcca gcctagccct acccccaact aagaaggnac tggccccaac 360
aagnatcacc cgctaaatcc ctanaatcca ctcctaaaca ctccgtatat cgatcaggat 420
atcatcactg actcacatat ctaatagaaa aaacngaaac aatantcanc atgnttatta 480
aatttatggt ntctatttac c 501

<210> 361
<211> 393
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (357)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (359)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (367)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<400> 361
gccccattat tcctagaacc aggcgacctg cgactccttg acgttgacaa tcgagtagta 60
ctcccgattg aagcccccat tcgtataata attacatcac aagacgtctt gcactcatga 120
gctgtcccca cattaggctt aaaaacagat gcaattcccg gacgtctaaa ccaaaccact 180
ttcaccgcta cacgaccggg ggtatactac ggtcaatgct ctgaaatctg tggagcaaac 240
cacagtttca tgcccatcgt cctagaatta attcccctaa aaatctttga aatagggccc 300
gtatttaccc tatagcaccc cctctacccc ctctagagcc aaaaaaaaaa aaaaagntnc 360
aagnttnaaa aaactgaaaa tcagaaaagn ttt 393

<210> 362
<211> 664
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (535)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (551)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (567)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (642)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (660)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (662)
<223> n equals a,t,g, or c

<400> 362
gagtaggtct acaagacgct acttccccta tcatagaaga gcttatcacc tttcatgatc 60
acgccctcat aatcattttc cttatctgct tcctagtcct gtatgccctt ttcctaacac 120
tcacaacaaa actaactaat actaacatct cagacgctca ggaaatagaa accgtctgaa 180
ctatcctgcc cgcatcatcc tagtcctcat cgccctccca tccctacgca tcctttacat 240
aacagacgag gtcaacgatc cctcccttac catcaaatca attggccacc aatggtactg 300
aacctacnaa gtacaccgac tacggcggac taatcttcaa ctcctacata cttccccatt 360
attcctagaa ccaggcgacc tgcgactcct tgacgttgac aatcgagtag tactcccgat 420
tgaagccccc attcgtataa taattacatc acaagacgtc ttgcactcat gagctgtccc 480
cacattaggc ttaaaaacag atgcaattcc ccgacgtcta aaccaaacca ctttnaccgg 540
tacacgaacc nggggtatta ctacggncaa tgctctgaaa tctggggagc aaaaccacag 600
gttcatgccc atcgtcctag aaataaattc ccctaaaaat cnttgaaaaa aggggcccgn 660
antt 664

<210> 363
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (466)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (467)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (485)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (515)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (552)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (557)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (559)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (568)
<223> n equals a,t,g, or c

<400> 363
gcgcaagtag gtctacaaga cgctacttcc cctatcatag aagagcttat cacctttcat 60
gatcacgccc tcataatcat tttccttatc tgcttcctag tcctgtatgc ccttttccta 120
acactcacaa caaaactaac taatactaac atctcagacg ctcaggaaat agaaaccgtc 180
tgaactatcc tgcccgccat catcctagtc ctcatcgccc tcccatccct acgcatcctt 240
tacataacag acgaggtcaa cgatccctcc cttaccatca aatcaattgg ccaccaatgg 300
tactgaacct acgagtacac cgactacggc ggactaatct tcaactccta catacttccc 360
ccattattcc tagaaccagg cgacctgcga ctccttgacg tttgacaatc gagtagtact 420
cccgattgaa gcccccattc gtataataat tacatcacaa gacgtnnttg cactcatgag 480
ctgtncccac attaagctta aaaacagatg cattnccgga cgtctaaacc aaaccacttt 540
caccgataca cnaaccngng ggtatacnac cggtcaatgc ttctgaaatc ttgtg 595

<210> 364
<211> 441
<212> DNA
<213> Homo sapiens

<400> 364
acaagacgct acttccccta tcatagaaga gcttatcacc tttcatgatc acgccctcat 60
aatcattttc cttatctgct tcctagtcct gtatgccctt ttcctaacac tcacaacaaa 120
actaactaat actaacatct cagacgctca ggaaatagaa accgtctgaa ctatcctgcc 180
cgccatcatc ctagtcctca tcgccctccc atccctacgc atcctttaca taacagacga 240
ggtcaacgat ccctcccttt accatcaaat caattgggcc accaatggta ctgaacctac 300
gagtacaccg actacggcgg actaatcttc aactcctaca tacttccccc attattccta 360
gaaccaggcg acctgcgact ccttgacgtt gacaatcgag tagtactccc gattgaagcc 420
cccattcgta taataattaa c 441

<210> 365
<211> 367
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (347)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (362)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (363)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (367)
<223> n equals a,t,g, or c

<400> 365
catacttccc ccattattcc tagaaccagg cgacctgcga ctccttgacg ttgacaatcg 60
agtagtactc ccgattgaag cccccattcg tataataatt acatcacaag acgtcttgca 120
ctcatgagct gtccccacat taggcttaaa aacagatgca attcccggac gtctaaacca 180
aaccactttc accgctacac gaccgggggt atactacggt caatgctctg aaatctgtgg 240
agcaaaccac agtttcatgc ccatcgtcct agaattaatt cccctaaaaa tctttggaaa 300
tagggcccgt atttacccta tagcaccccc tctacccccct ctagagncaa aaaaaaaaaa 360
annagnn 367

<210> 366
<211> 460
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (154)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (211)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (322)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (336)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (340)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (355)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (356)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (411)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (413)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (415)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (453)
<223> n equals a,t,g, or c

<400> 366
ttttcgaggc caacgatccc tcccttacca tcaaatcaat tggccaccaa nggtaccgaa 60

cctacgagta caccgactac ggcggactaa tcttcaactc ctacatactt cccccattat 120
tcctagaacc aggcgacctg cgactccttg acgntgacaa tcgagtagta ctcccgattg 180
aaaccccccat tcggataata attacataca nggacgtctt gcactcatga gctgccccac 240
attaggctta aaaacagatg caattcccgg acgtctaaac caaaccacta tcaccgctac 300
acgaccgggg gtatactacg gncaatgctc tgaaanctgn ggagcaaacc acagnntcat 360
gcccatcggc ctagaatnaa ttcccctaaa aatctttgaa atagggcccg nantnaccct 420
atagcacccc ctctaccccc tctagagcca aanaaaaaaa 460

<210> 367
<211> 610
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<400> 367
gcaagntgac acnaaccctc actaaaggga acaaaagctg gagctccacc gcggtgcggc 60
cgctctagaa ctagtggatc ccccgggctg caggaattcg gcacgaggga atggcggctt 120
ccatctctga ggcgagcgac gctatggatc ccacagtggt ttgctaagaa ggccattttc 180
aactctccac tggaggctgc tatggcgttc cctcacctgc agcagcccag ctttctactg 240
gctagcctga aagctgactc tataaataag ccctttgcac agcagtgcca agacttggtt 300
aaagtcattg aggactttcc agcaaagtct gaaccaatca gagtccttgt gactggagca 360
gctggtcaaa ttgcatattc actgctgtac agtattggaa atggatctgt ctttggtaaa 420
gatcagatgt catcgcaaca gataaagaag acgttgcctt caaagacctg ggatgtggcc 480
attcttgtgg gctccatgcc aagaagggaa ggcatggaga gaaaagattt actgaaagca 540
aatgtgaaaa tcttcaaatc ccagggtgca gccttagata aatacggcaa gaagtcagtt 600
aaaggttatt 610

<210> 368
<211> 548
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (370)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (412)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (429)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (471)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (490)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (495)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (528)
<223> n equals a,t,g, or c

<400> 368
ggcacgagga gcactctatt tattgtactg tgaataatga tgaaggagag tggagtggcc 60
caccacctga atgcagagga aaatctctaa cttccaaggt cccaccaaca gttcagaaac 120
ctaccacagt aaatgttcca actacagaag tctcaccaac ttctcagaaa accaccacaa 180
aaaccaccac accaaatgct caaggtacag agactccatc agttcttcaa aaacacacca 240
cagaaaatgt ttcagctaca agaaccccac caactcctca gaaacccacc acagtaaatg 300
tcccagctac aatagtcaca ccaacacctc agaaacccac cacattaatg ttccagttac 360
aggagtctcn tcaacacntc aagncacacc tagtaatgtt tcagttacag gncctaccac 420
ttttcgganc ccaccggggc aatgttcgnc accattcccg cgcgttcggc ntttctttca 480
aaaccttttn caagnccttt tgcgttagat cctgtggcat gttttgtnca cggcccttac 540
ggccaggt 548

<210> 369
<211> 538
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (423)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (466)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (521)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (531)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (538)
<223> n equals a,t,g, or c

<400> 369
gatggcgcgg anccgggacg cgcgtacgcc ctgctgcttc tcctgatctg ctttaacgtt 60
ggaagtggac ttcacttaca ggtcttaagc acaagaaatg aaaataagct gcttcctaaa 120
catcctcatt tagtgcggca aaagcgcgcc tggatcaccg cccccgtggc tcttcgggag 180
ggagaggatc tgtccaagaa gaatccaatt gccaagatac attctgatct tgcagaagaa 240
agaggactca aaattactta caaatacact ggaaaaggga ttacagagcc accttttggt 300
atatttgtct ttaacaaaga tactggagaa ctgaatgtta ccagcattct tgatcgagaa 360
gaaacaccat tttttctgct aacaggttta cgctttggat gcaagaggga acaatgtaga 420
ganacccttt agagctacgc attaagggnt cttgatatcc aattgncaac ggaaccagtg 480
gttcacacag ggatgtcttt gttggggcct gttgaagagt ngaggtgcag nacatacn 538

<210> 370
<211> 538
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (401)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (492)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (500)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (536)
<223> n equals a,t,g, or c

<400> 370
gagctcagtc cccatcccga agcacagggc aggacgtcgc ggcggagtgg ggaagcgagg 60
agtccgtggc cgggagcttg gaggctgagt ttgagaaagc tgcagaggag gttaggcacc 120
ttaagaccaa gccatcggat gaggagatgc tgttcatcta tggccactac aaacaagcaa 180
ctgtgggcga cataaataca gaacggcccg ggatgttgga cttcacgggc aaggccaagt 240
gggatgcctg gaatgagctg aaagggactt ccaaggaaga tgccatgaaa gcttacatca 300
acaaagtaga agagctaaag aaaaaatacg ggatatgaga gactggattt ggttactgtg 360
ccatgtgttt atcctaaact gagacaatgc cttgtttttt nctaataccg tggatggtgg 420
gaatccggga aaataaccag ttaaaccagc tactcaaggc tgctcaccat acggctctaa 480
cagattaggg gntaaaacgn ttactgactt ccttgagtag ttttacctga aaccantt 538

<210> 371
<211> 224
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (59)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (68)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (90)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (108)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (113)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (123)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (171)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (192)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (204)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (215)
<223> n equals a,t,g, or c

<400> 371
gcctgtgcct acacaccacc ntcgcngaaa gctgtgcagc gcattgcnga gtctcaccng 60
cagtctanca gcaatttgaa tgagaaccan gcctcagagg aggagganga gcngggggag 120
ctncgggagc tgggttatcc nagagaggaa gatgaggagg aagaggagga ngatgaagaa 180
gaggaagact angaggacag ccangctgaa gaccngagcg gaga 224

<210> 372
<211> 459
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (52)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (90)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (139)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (140)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (176)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (208)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (328)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (429)
<223> n equals a,t,g, or c

<400> 372
aacttnccca atgccgaact gggaggcccc tttaaccaga tgaacggagt gnccggaaat 60
ggcatgaaca acattgacat gactggagan aagaagtcgt tgganctccc atatcccagc 120
agctttgctc ccgtctctnn acctagaaac cagaccttca cttacatggg caagtnctcc 180
attgaccctc agtaccctgg tgccagcngc tacccagaag gcataatcaa tattgtgagt 240
gcaggcatct tgcaaggggt cacttcccca gcttcaacca cagcctcatc cagcgtcacc 300
tctgcctccc ccaacccact ggccacanga cccctgggtg tgtgcaccat gtcccagacc 360
cagcctgacc tggaccacct gtactctccg ccancgcctc ctcctcctta ttctggctgt 420
gcaggaganc tctaccagga cccttctgcg ttcctgtta 459

<210> 373
<211> 422
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (27)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (47)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (60)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (66)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (70)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (78)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (87)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (267)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (331)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (359)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (393)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (401)
<223> n equals a,t,g, or c

<400> 373
ggcagacctg aggcccatcc ccaaggngcc cagccgtagc ttcaggntct ccgccagggn 60
ccctcncggn tgcttctngt ttttaanact tccagatcga tcctntcctc ggtaccgtgg 120
gctttgggtc tggcctccac gggtgggcct tcaccctgaa agcagtttgc cgagaatgta 180
tgtgagccaa gttcgccgcc aagggggagg gccagttggg agcctgccga gcgggccaag 240
aaagtagagg acatgatgaa gaagctntgg ggtgacaggt gagccccggg gaatatggtg 300
ggggattcct gaaaactggg ggtagtggca ncaacgtagg ggcgtggtgt nctattcana 360
attggttcaa gcccacaagt tttgcccaaa atnttccctt ngggaccaac ttcccaagta 420
at 422

<210> 374
<211> 342
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (20)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (301)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (305)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<400> 374
gcanaacatc agcgcnnacn gganataaaa agattatcca cagagcattc cagtgtatca 60
gagtatcatc cagccgatgg ctatgcgttc agtagcaaca tttacacaag aggatcccac 120
ctggaccaag gggaagctgc tgttgctttt aagccaactt ctaatcgcca tattagattg 180
aaattatgaa ccactccaaa acacaaccca agaaatatgc ccaatcccag ttatgacttt 240
gtttgccagg ggaaacaaca gttgagctct ccgggttcct taaggaatga tntttttaga 300
naatnccttg aaatgaatcg gaaancatgg tngaaaaagt tt 342

<210> 375
<211> 387
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (162)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (305)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (335)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (365)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (374)
<223> n equals a,t,g, or c

<400> 375
ggcagagctc tgcgcgcant ccgcttgact cagctcaccg agattctgtc agggggtgtt 60
tatattgaga agaacgataa gctttgtcac atggacacaa ttgactggag ggacatcgtg 120
agggaccgag atgctgagat agtggtgaag gacaatggca gnaagctgtc ccccctgtca 180
tgaggtttgc aaggggcgat gctggggtcc tggatcagaa gactgccaga cattgaccaa 240
gaccatctgt gcttcctcag tgtaattggt cactgctttg gggcccaacc ccaaccagtg 300
gttgncatga tgagtgtggc cgggggttgt ttcanggccc cttcagggac acagactgtt 360
tttgnntggc cggnatttca atggaca 387

<210> 376
<211> 492
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (203)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (318)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (336)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (416)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (444)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (448)
<223> n equals a,t,g, or c

<400> 376
ggcacgagaa gcaaactcaa agcatttggg tcaaaacatc ctgattgttt tatacatggt 60
ttggatgata aattcagtaa agatacaggc ataatcctta tatgcaaatn agttgatggg 120
tattttctat ggtgatttca gacaaggaac ctgcaggtca ctctggaaga tggttacatt 180
gaattgagca ccagcgatag ggncggccca atttttaaat ctccacagac gtatatggat 240
ggtttactgc attatgtatc tgtaataagc gacaactctg ggtgagtcga ataaatactt 300
ctgtcagagc tgtgagtnga gttttactct ctnttngttt taatggaatt ttctggtgtc 360
tttttgcaaa aaatttgtcc ttgattacca aaaatacttt cactnataag tcttgncctt 420
ctttcctttt ttcccatatn caantttnct tcataaaaaa aataaacttg ccacacatgg 480
gtgggcttca tt 492

<210> 377
<211> 336
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (15)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (36)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (66)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (70)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (116)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (163)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (197)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (227)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (229)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (231)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (249)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (280)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<400> 377
gacngtaccg tcccnaatcc cgggtcgacc cacgcntccg aagcagcagt tagcccgccg 60
cccgcntgtn tgtccccaga gccatggaga gagccagtct gatccagaag gccaanctgg 120
cagagcaggc cgaacgctat gaggacatgg cagccttcat ganaggcgcc gtggagaagg 180
gcgaggagtc tcctgcnaag agcgaaacct gctctcagta gcctatnana ncgtggtggg 240
cggccagang gctgcctgga gggtgctgtc cagtattgan cagaaaagca angaggaggg 300
gttcgganag gagaaggggc ccgangtgcg ttgaat 336

<210> 378
<211> 488
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (20)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (35)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (43)
<223> n equals a,t,g, or c

<400> 378
cngtcagtna cggtaccggn aattcccggg tgcgnaccca cgncgtgccg ccgagaccgc 60
tgccttgctc ggaaggggc gagcggctgc tgcccaccca gaagcagccc gggggcggcc 120
aggtcaactc cagccgctac aagacggagc tgtgccgccc ctttgaggaa aacggtgcct 180
gtaagtacgg ggacaagtgc cagttcgcac acggcatcca cgagctccgc agcctgaccc 240
gccaccccaa gtacaagacg gagctgtgcc gcaccttcca caccatcggc ttttgcccct 300
acgggccccg ctgccacttc atccacaacg ctgaagagcg ccgtgccctg gccgggggccc 360
gggacctctc cgctgaccgt ccccgcctcc agcatagctt tagtttgctg ggtttcccag 420
tgccgctgcc accgccgctg ccaccgggct gctggacagc ccacgtccat caacccaacc 480
cctatttt 488

<210> 379
<211> 398
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (46)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (124)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (385)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (386)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<400> 379
ggcacgaggg ggcctcccgc tgtggccacc tctgccgcgg ccgcgncgcc gcgtcctacc 60
ctgccctccg tgcctctctg ctgccgcagt cgctggcggc ggcggccgcg ttcccgacgc 120
gcantaacag ccaggagtcc aaaactactt acctggaaga ccttccacca cccccctgagt 180
atgaattggc cccgtccaag ttagaagagg aagtggatga tgtctttctc attcgagctc 240
aaggactgcc ctgggtcatg gcactatggg aagatgtggc tttaactttt tttttccaga 300
cttgcagaat ccggcaacgg ttgagtaatg ggaattacat tttnctccct aaaaacaaga 360
gatgggggaa aacgtaaggg ggtnnntggc cttnaatt 398

<210> 380
<211> 455
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (365)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (421)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (442)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (447)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (448)
<223> n equals a,t,g, or c

<400> 380
atgccatggt gcggctggtc aagtgcgacg tctaccccctg ccccaacaca gtggactgct 60
tcgtgtcccg ccccaccgag aaaaccgtct tcaccgtctt catgctagct gcctctggca 120
tctgcatcat cctcaatgtg gccgaggtgg tgtacctcat catccgggcc tgtgcccgcc 180
gagcccagcg ccgctccaat ccaccttccc gcaagggctc gggcttcggc caccgcctct 240
cacctgaata caagcagaat gagatcaaca agctgctgag tgagcaggat ggctccctga 300
aagacatact gcgcncaacc ctggcacggg ggctgggctg gctgaaaaaa acgaccgtgc 360
tcggntgtga tgccacatac caggcaacct cccatcccac cccgaccttg cctgggcgaa 420
nccctccttc tccctgccgg tncccanngg ctcac 455

<210> 381
<211> 421
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (23)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (156)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (191)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (398)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (410)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (413)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (421)
<223> n equals a,t,g, or c

<400> 381
ntnngcgnct gcaggtcgaa cantagtgga tccaaagaat tcggcacgag tgggaacgag 60
gggtgaagcg gcccaggtga ggctcgccat ggccaaacag ctgcaggccc gaagctagac 120
gggatcgact acaacccctg ggtggagttt gtgaantggc cagtgagcat gacgtcgtga 180
acttgggcca nggcttcccg gatttcccac caccagactt tgccgtggaa gcctttcagc 240
acgctgtcag tggagacttc atgcttaacc agtacaccaa gacatttggt tacccaccac 300
tggacgagga tcctggcaat ttctttgggg gagctgctgg gtcaaggata agacccgttc 360
agggatgtgc tggtgactgt tggtggntat gggggccngt ttcaaaagcn ttnccaggcc 420
n 421

<210> 382
<211> 545
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (57)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (466)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (505)
<223> n equals a,t,g, or c

<400> 382
aaggnagaca caancctcac taaagggaac aaaagctgga gctccaccgc ggtgcgnccg 60
ctctagaact agtggatccc ccgggctgca ggaattcggc acgagcggcg gcggcggcgg 120
cggcccagtc ggtgtatgcc ttctcggcgc gcccgctggc cggcggggag cctgtgagcc 180
tgggctccct gcggggcaag gtactactta tcgagaatgt ggcgtccctc tgaggcacca 240
cggtccggga ctacacccag atgaacgagc tgcagcggcg cctcggaccc cggggcctgg 300
tggtgctcgg cttcccgtgc aaccagtttg ggcatcagga gaacgccaag aacgaagaga 360
ttctgaattc cctcaagtac gtccggcctg gtggtgggtt cgagcccaac ttcatgctct 420
tcgagaagtg cgaggtgaac ggtgcggggg cgcaccctct cttcgncttc ctgcgggagg 480
ccctgccagc tcccagcgac gacgncaccg cgcttatgac cgaccccaag ctcatcacct 540
ggtct 545

<210> 383
<211> 375
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (224)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (242)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (264)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (282)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (329)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<400> 383
gctttcattg ccaagtcctt ctatgacctc agtgccatca gcctggatgg ggagaaagta 60
gatttcaata cgtctcgggg cagggccgtg ctgattgaga atgtggcttc gctctgaggc 120
acaaccaccc gggacttcac ccagctcaac gagctgcaat gccgctttcc caggcgcctg 180
gtggtccttg ggcttccctt gcaaccaatt tgggacatca gganaactgt caaaatgagg 240
anatcctgaa cagtctcaat tatnttccgt cctggggtgg gnataccaac ccccttccc 300
ccttttttcca aaaattttaa ggttaaatng gcnaaaaaaa acatcctntt tttcccccta 360
ccttaaanga aaaac 375

<210> 384
<211> 530
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (178)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (354)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (361)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (386)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (415)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (426)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (436)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (515)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (527)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (529)
<223> n equals a,t,g, or c

<400> 384
gctcgtgccg tgagacacaa ccacccggga cttcacccag ctcaacgagc tgcaatgccg 60
ctttcccagg cgcctggtgg tccttggctt cccttgcaac caatttggac atcagagcag 120

gagagacaga agtagcaaac cctctttcga gatgtccctc cagccccaga agtacctnca 180
gcctcacacc atctcttcag cctagcaagt tgctggaggg agtctataac ctaccaggag 240
ccagccagcc atttgtatca agaaatagaa atctgcaggg tacagtggct cacacctata 300
atcccagcgc tttgggaggc taagttctag gacaaaggca aggaagaaaa gcangaactt 360
naaaatccaa ttccttttgg gncttnaaat ttaaccttca agttcaaggg agctnaagta 420
aggcanaagg ccaaanggct ttttacttna acaacaacgg tgccaatttg gaaaggcaag 480
gccaaggcaa aaaacccagg ggcaagaagg aaaangggaa aaggggntnt 530

<210> 385
<211> 465
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (151)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (287)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (310)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (312)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (329)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (338)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (347)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (354)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (373)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (383)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (438)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (450)
<223> n equals a,t,g, or c

<400> 385
cacactcaag ttctttcctg ccagtgccga caggacggtc atcgattaca acggggaacg 60
cacgctggat ggttttaaga aattcctgga gagcggtggc caggatgggg caggggatga 120
tgacgatctc gaggacctgg aagaagcaga ngagccagac atggaggaag acgatgatca 180
gaaagctgtg aaagatgaac tgtaatacgc aaagccagac ccgggcgctg ccgagacccc 240
tcggggggct gcacaaccag cagcagcgca aggcttccga gccttgnggg ctcggtttga 300
aaagaagggn tngccgggaa acccagggna actctctnga agttganact ncanccctag 360
aaaacgtccg ttnaaccccg ttnctttctt ctgcttttcg ggtttttgga aaagggattc 420
atttccaggc aggccaanct tgttggggnn tgttcctgaa accat 465

<210> 386
<211> 733
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (606)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (621)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (689)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (703)
<223> n equals a,t,g, or c

<400> 386
gcggtgatca tgggggcccc gggctcgggc aagggcaccg tgtcgtcgcg catcactaca 60
cacttcgagc tgaagcacct ctccagcggg gacctgctcc gggacaacat gctgcggggc 120
acagaaattg gcgtgttagc caaggctttc attgaccaag ggaaactcat cccagatgat 180
gtcatgactc ggctggccct tcatgagctg aaaaatctca cccagtatag ctggctgttg 240
gatggttttc caaggacact tccacaggca gaagccctag atagagctta tcagatcgac 300
acagtgatta acctgaatgt gccctttgag gtcattaaac aacgccttac tgctcgctgg 360
attcatcccg ccagtggccg agtctataac attgaattca accctcccaa aactgtgggc 420
attgatgacc tgactgggga gcctctcatt cagcgtgagg atgataaacc agagacggtt 480
atcaagagac taaaggctta tgaagaccaa acaaagccag tcctggaata ttaccagaaa 540
aaaggggtgc tggaaacatt ctccggaaca gaaaccaaca agatttggcc ctatgtatat 600
gctttnctac aactaaagtt ncacaaagaa gccagaaagc tttaattact tcatgaggag 660
aaatgtgtgt aactattaat agtaagaang gcaaaccttc tantccttgg atttaaaact 720
ggttttctaa aac 733

<210> 387
<211> 180
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (61)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (123)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (133)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (151)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (153)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<400> 387
nctttnatct ntgaagtgga tctacaatgg cttcagcagt gtnctccagt tcctaggact 60
ntacaagaaa tctggaaaac ttgtattctt caggcttggt taatgtcagg caaaaccact 120
gtngttgcac atngcttcaa aggtgcgcag ntngtgggnc aacattgttt cccaacactt 180

<210> 388
<211> 428
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (49)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (84)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (90)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (197)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (263)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (285)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (306)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (395)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (418)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (427)
<223> n equals a,t,g, or c

<400> 388
gggaacagta agaccgagga ccagcgcaac gaggagaagg cgcacgtgna ggccaacaaa 60
aagatcgaga agcagctgca gaangacaan caggtctacc gggccacgca ccgcctgctg 120
ctgctgggtg ctggagaatc tggtaaaagc accattgtga agcagatgag gatcctgcat 180
gttaatgggt ttaatgnaga cagtgagaag gcaaccaaag tgcaggacat caaaaacaac 240
ctgaaagagg cgattgaaac cantgtggcc gccatgagca acctnngtgc cccccgtgga 300
gctggncaac cccgagaaac cagttcagag tggactacat cctggagtgt tatgaacgtg 360
cctggntttt gacttccctc cggattctat gagcnggcaa ggtctgtgga ggtnaagntt 420
ctgctgna 428

<210> 389
<211> 454
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (181)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (184)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (209)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (240)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (283)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (287)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (309)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (316)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (319)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (369)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (402)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (426)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (437)
<223> n equals a,t,g, or c

<400> 389
acccacgcgt ccgcccacgc gtcccgagct caaagacctc caggagcccc aggagcccag 60
ggttgggaaa ctcaggaact ttgcacccat ccctggtgaa cctgtggttc ccatcctctg 120
tagcaacccg aactttccag aagaactcaa gcctctctgc aagagcccaa tgcccaggag 180

ntanttcaga ggctggagga aatcgctgna ggacccgggg cacatgtgga aatctgtgcn 240
tacgctggcc tgtaccggat gctaaggggg cttgccactg gcnggcntcc cntccgcagc 300
aggggaagnc ttttcntcnt gcagaaaggg ccacccatga tattccattc cccagcagtt 360
caactaacnt ggttccattc gggaaggagc agccggggaa gnattgggtt gattggaagg 420
cttngnccca aatggtnctt tccctggcaa tttt 454

<210> 390
<211> 553
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (30)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (58)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (77)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (417)
<223> n equals a,t,g, or c

<400> 390
gcaaganaaa attaccctca ctaaagggnn caaaagctgg agctccaccg cggtgcgncc 60
gctctagaac tagtggntcc cccgggctgc aggaattcgg cacgagcagg gacgctaaga 120
ttgctacctg gactttcgtt gaccatgctg tcccgggtgg tactttccgc cgccgccaca 180
gcgccccctc tctgaagaat gcagccttcc taggtccagg gaccctatgt actcggaact 240

gggcttatct tgtacgcttt atccaaagaa atatatgtga ttagcgcaga gaccttcact 300
gccctatcag tactaggtgt aatggtctat ggaattaaaa aatatggtcc ctttgttgca 360
gactttgctg ataaactcaa tgagcaaaaa cttgcccaac tagaagaggc gaanagngct 420
tccatccaac acatccagaa tgcaattgat acggagaagt cacaacaggc actggttcag 480
aagcgccatt accttttgg atgtgcaaag gaataacatt gctatggctt tggaagttac 540
ttacccggga acg 553

<210> 391
<211> 632
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (586)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (613)
<223> n equals a,t,g, or c

<400> 391
cagtttcgaa antaaccctc actaaaggga acaaaagctg gagctccacc gcggtgcggc 60
cgctctagaa ctagtggatc ccccgggctg caggaattcg gcacgaggtc ctgtgcggtc 120
acttagccaa gatgcctgag gaaacccaga cccaagacca accgatggag gaggaggagg 180
ttgagacgtt cgcctttcag gcagaaattg cccagttgat gtcattgatc atcaatactt 240
tctactcgaa caaagagatc tttctgagag agctcatttc aaattcatca gatgcattgg 300
acaaaatccg gtatgaaagc ttgacagatc ccagtaaatt agactctggg aaagagctgc 360
atattaacct tataccgaac aaacaagatc gaactctcac tattgtggat actggaattg 420
gaatgaccaa ggctgacttg atcaataacc ttggtactat cgccaagtct gggaccaaag 480
cgttcatgga agctttgcag gctggtgcag atatctctat gattggccag ttcggtgttg 540
gtttttattc tgcttatttg gttgctgaga aagtaactgt gatcancaaa cataacgatg 600
atgagcagta cgnttgggag tcctcagcag gg 632

<210> 392
<211> 600
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (162)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (518)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (571)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (572)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (587)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (590)
<223> n equals a,t,g, or c

<400> 392
gctcanatct gccttctgga gactgcgccg tcctcccggg agagccagaa agaggacatg 60
gctgctgggc agcgggaagc gaggccccag gtgtcactga cattcgagga cgtggctgtg 120
ctctttacct gggatgagtg gagaaagctg gctccttctc anagaaactt gtaccgggat 180
gtgatgctgg agaactatag gaacctggtc tcactgggac tctcatttac caaaccaaaa 240
gtcatctccc tgttgcagca aggagaagat ccctgggagg tggagaaaga cagttctggt 300
gtctcctctc taggatgtaa gagcacacct aaaatgacaa agtcaactca aactcaggat 360
tcatttcagg agcagataag gaaaagattg aaaagggatg aaccctggaa cttcatatca 420
gaaagatcct gcatatatga agagaaatta aagaaacagc aggacaaaaa tgaaaattta 480
caaataattt cagttgccca tacaaaaatc cttactgnag atagaagcca taaaaatgtt 540
gaatttgccc aaaacttcta cctgaaatca nncttcatta agcaccngan aattgcctaa 600

<210> 393
<211> 531
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (63)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (267)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (352)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (395)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (400)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (451)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (464)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (471)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (476)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (512)
<223> n equals a,t,g, or c

<400> 393
tgcagctctt ttcattttgc catccttttc cagctccatg atggttctgc aggtttctgc 60
ggncccccg gacagtggct ctgacggcgt tactgatggt gctgctcaca tctgtggttc 120
cagggcaggg ccactccaga gaattacctt ttccagggac ggcaggaatg ctacgcgttt 180
aatggtaaca gccagaagga catcctggag gagaaagcgg gcagtgccgg aacaggatgt 240
gcagacacaa cttacggagc tgggcgngcc catggaccct gcagcgccga gttccagcct 300
agggtggaat gttttccccc tccaagtagg gggcccttgg cagcaacaca anctgcttgt 360
ttggccaagt gacggntttt tacccaggca gcanngggtan tcctgtcaac tggattggag 420
gcacatttga ttttgcccgg ttagacatga nggggttggg ttcngttggt naaatntggg 480
ttgggaattt taatgaaaaa ggggggcaaa gnaattttaa agggggggttt t 531

<210> 394
<211> 404
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (269)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (295)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (399)
<223> n equals a,t,g, or c

<400> 394
gggactctaa ttctgtaata tatcaaggaa tctcgtaaaa ccgacactaa aacgtccctg 60
cctacaaatc atccggccaa attatgagtt cattgtatta tgcgaatgct ttattttcta 120
aatatccagc ctcaagttcg gttttcgcta ccggagcctt cccagaacaa acttcttgtg 180
cgtttgcttc caaccccag cgcccgggct atggagcggg ttcgggcgct tccttcgccg 240
cctcgatgca gggcttgtac cccggcggng ggggcatggc gggccagagc gcggncggcg 300
tctacgcggc cggctatggg ctcgagccgn gttccttcaa catgcactgc gcgccctttg 360
agcagaaacc tctccggggt gngcccnggn gaattccgnc aagg 404

<210> 395
<211> 499
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (89)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (90)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (93)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (95)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (98)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (112)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (115)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (119)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (120)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (125)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (149)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (172)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (211)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (223)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (225)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (299)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (426)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (442)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (443)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (445)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (457)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (470)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (477)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<400> 395
ggcacgaggn gcggcgggtc tggagccccc atcctcctgc ggcagatgtt cgagcctgta 60
agctgcacct tcacgtacct gctgggtgnn agngngtncc gggaggccgt tntgntcgnn 120
ccagncctgg aaacagcgcc tcgggatgnc cagctgatca aggagctggg gnttcggctg 180
ctctatgctg gcgttggaga ccagggccag ncctggccac aantnaggct gtgtcacctt 240
cgttctgaat gaccacagca tggccttcac tggagatgcc ctgttgatcc gtgggtgtng 300
gcggacagac tttcagcaag gctgttgcca agaccttgta accattcggt ccatgaaaag 360
atctttcaaa atttccagga gactgtcttg atctaacctg gttcaaggtt accatggggt 420
ttaaantgtt caacgtggag gnngnggagg acttttnaaa cccttggttn aaccttnaat 480
tttnaggagt ttttcaaaa 499

<210> 396
<211> 526
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (445)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (502)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (508)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (519)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (523)
<223> n equals a,t,g, or c

<400> 396
ggtccccgtc acgctgactt tccgtgcagt gctgtggtgc gaaaatgcct cgccgctcct 60
ggtagacgaa gaggaagaca aacctacagt cgcttccaaa ctctagagtt ggaaaaggaa 120
tttcttttta accccctatct gaccaggaaa agaagaatcg aggtttccca cgccctagcc 180
ctcaccgaga gacaggtaaa aatctggttc cagaacagga gaatgaaatg gaaaaaggaa 240
aacaacaagg acaaatttcc cgtttcccgg caggaggtga aggacgggga aacgaaaaag 300
gaagcccaag agctggagga agacagagcc gaaggcctga caaattaact tctaccttta 360
aaatttacca cagactatta aaactaataa tcaccatatg ctgtggacac cacctatttt 420
ctttggtgga aaggacctta cctgngtttc aagctacctt catgtcactg gtcttgaggg 480
tttctgggct tttgagaggg antttggngg tttaaaaang ttntag 526

<210> 397
<211> 443
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (94)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (443)
<223> n equals a,t,g, or c

<400> 397
gcccacgcgt ccgggtgctc cttacctccc cggtggtcgg gcgcgaatta ctggaaattg 60
gcttttcccg ttggggccga agtaccttcc ctgnggcggc gactcagcgg ggtgtcgttc 120
ggccggcgtg acgcagccgg atcggcgcca gacggaaacc tagcggtgac tgtatctgaa 180
ttttgcagct gcagaatgtg tagtacctta aaaggttggc aacaatgagt aaaccagaat 240
taaaggaaga caagatgctg gaggttcact ttgtgggaga tgatgatgtt cttaatcaca 300
ttctagatag agaaggagga gctaaattga agaaggagcg agcgcacttt tggtcaaccc 360
caaaaaaata ataaagaagc cagaatatga tttggaggaa gatgaccagg aggtcttaaa 420
agatcagaac tatgtggaaa ttn 443

<210> 398
<211> 652
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (64)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (68)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (78)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (88)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (91)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (100)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (103)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (111)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (116)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (134)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (261)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (383)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (549)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (579)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (594)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (606)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (620)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (639)
<223> n equals a,t,g, or c

<400> 398
gcccacgcgt ccgnanacgc ntccgtttgg nccaagatgg catggaatga ggaaggcgct 60
tccntggnga ctggtggnct tggcgtcnct ncgggctgtn agnacctcat ntatgngcac 120
tttaccaaag cggntgaaaa ttgtggaagt tggtccccga gatggactac aaaatgaaaa 180
gaatatcgta tctactccag tgaaaatcaa gctgatagac atgctttctg aagcaggact 240
ctctgttata gaaaccacca nctttgagtc tcctaagtgg gttccccaga tgggtgacca 300
cactgaagtc ttgaagggca ttcanaagtt tcctggcatc aactacccag tcctgacccc 360

aaatttgaaa ggcttcgagg cancggnacc atgactnctg tgaggatgca gcactccctg 420
gcaggtcaga cctatgccgt gcccttcatc cagccagacc tgcggcgaga ggaggccgtc 480
cagcagatgg cggatgccct gcagtacctg cagaaggctc tggagacatc ttcagcaagt 540
gggtgctgnc actcaccccc acctgatgag agggccatnc ctgtctgggc aatnccagca 600
acacanccct tgggagcaan ccccttgggg aatcccggnc tggggaaccc at 652

<210> 399
<211> 341
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (39)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (84)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (137)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (153)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (302)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (310)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<400> 399
ggcacgagag gacctggata aagcacttct aaaggcctnt caggacatgt tcgacaagaa 60
aaccaaggct tccctttacc tctncactca caatgggaac atgtacacct catccctgta 120
cgggtgcctg gcctcgnttc tgtcccacca ctntgcccaa gaactggctg gctccaggat 180
tggtgccttc tcttatggct ctggtttagc agcaagtttc ttttcatttc gagtatcccg 240

tctaaaggtg ttctgcagat ccatggaaag cttctgggaa acgtatgcta gcagagcttc 300
tncccgtgan tcatattttt aagatcccac tnttagctgg a 341

<210> 400
<211> 604
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (392)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (502)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (509)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (559)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (593)
<223> n equals a,t,g, or c

<400> 400
gcctccgcat aggcctgcgt cagattaaaa cactgaactg acaattaaca gcccaatatc 60
tacaatcaac caacaagtca ttattaccct cactgtcaac ccaacacagg catgctcata 120
aggaaaggtt aaaaaaagta aaaggaactc ggcaaatctt accccgcctg tttaccaaaa 180
acatcacctc tagcatcacc agtattagag gcaccgcctg cccagtgaca catgtttaac 240
ggccgcggta ccctaaccgt gcaaaggtag cataatcact tgttccttaa atagggacct 300
gtatgaatgg cttcacgagg gttcagctgt ctcttacttt taaccagtga aattgacctg 360
cccgtgaaga ggcggcatga cacagcaaga cnaagaagac cctatggagc tttaatttat 420
taatgcaaac agtacctaca aacccacagg tcctaactac caaacctgca ttaaaaaatt 480
cggntggggc gacctcggac anaaccaanc tccagcagta catgctaaac ttaccagcaa 540
acgactatat ctaattganc atacttgaca aggacaagta cctaggaaca ggnaatcttt 600
ttaa 604

<210> 401
<211> 519
<212> DNA
<213> Homo sapiens

<400> 401
cataatcact tgttccttaa ttagggacct gtatgaatgg ctccacgagg gttcagctgt 60
ctcttacttt taaccagtga aattgacctg cccgtgaaga ggcgggcata acacagcaag 120
acgagaagac cctatggagc tttaatttat taatgcaaac agtacctaac aaacccacag 180
gtcctaaact accaaacctg gcattaaaaa tttcggttgg ggcgacctcg gagcagaacc 240
caacctccga gcagtacatg ctaagacttc accagtcaaa gcgaactact atactcaatt 300
gatccaataa cttgaccaac ggaacaagtt accctaggga taacagcgca atcctattct 360
agagtccata tcaacaatag ggtttacgac ctcgatgttg gatcaggaca tcccgatggt 420
gcagccgcta ttaaaggttc gtttgttcaa cgattaaagt cctacgtgat ctgagttcag 480
accggagtaa tccaggtcgg tttctatcta ctttcaaat 519

<210> 402
<211> 265
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (23)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (213)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (218)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (255)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (264)
<223> n equals a,t,g, or c

<400> 402
gctgccagta gcatatgctt gtntcaaaga ttaagccatg catgtctaag tacgcacggc 60
cggtacagtg aaactgcgaa tggctcatta aatcagttat ggttcctttg gtcgctcgct 120
cctctcctac ttggataact gtggtaattc tagagctaat acatgccgac gggcgctgac 180
ccccttcgcg ggggggatgc gtgcatttat canatcanaa ccaacccggt canccccct 240
ccggccccgg ccggngggcg gcgnc 265

<210> 403
<211> 325
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (137)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (138)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (172)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (173)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (200)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (263)
<223> n equals a,t,g, or c

<400> 403
gcaggtactt ggttctccag tgggagctgc cctctcgaag gcaggacagc ggtggcggca 60
gatataaaga cctgaagata gtcttttctg tccaaagatg gaaaacagta ctactaccat 120
ttctcgggag gagcttnnag aactacaaga ggcatttaat aaaatagata tnnacaatag 180
tgggtatgtc agtgactatn aacttcaaga cctgtttaag gaagcaagcc ttcctctgcc 240
tggctacaag gtgcgcgaga ttntggagaa aattctatca gttgctgaca gcaacaaaga 300
tggcaaaatc aattttgaag agttt 325

<210> 404

<211> 540
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (473)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (489)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (526)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (537)
<223> n equals a,t,g, or c

<400> 404
ataactatat ctttcttcct ctgtctccgc ccacccacat ttttctcttt ccctttctct 60
ctttggggac cctcccccat gctcccctgc cccatcccct tttccccttc ccgtcttctc 120
atccctccat tcccatcttt ccccagcaat taccagctct ggctgggtcg ccacaacttg 180
tttgacgacg aaaacacagc ccagtttgtt catgtcagtg agagcttccc acaccctggc 240
ttcaacatga gcctcctgga gaaccacacc cgccaagcag acgaggacta cagccacgac 300
ctcatgctgc tccgcctgac agagcctgct gataccatca cagacgctgt gaaggtcggg 360
aagttgccca cccaggaacc cgaagtgggg gagcacctgg ttggcttccg gctggggcaa 420
gcattgaacc agaagaattt cttaatttca gaagatcttc aaatggtgng gancсttcaa 480
aaatcctgnc taaaggaata aatggcgaaa aaagcccaac gttcanaaag gtggacngga 540

<210> 405
<211> 319
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (94)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (298)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (301)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (309)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (313)
<223> n equals a,t,g, or c

<400> 405
ctgcnccgcc gcgggcccca gctgcgcgct gaaggccggc aagacagcga gcggtgcggg 60
cgaggtggtg cgctgtctgt ctgagcagag cgtnggccat ctcgcgctgc gccgggggcc 120
cggggcgcgc ctgcctgccc tgctggacga gcagcaggta aacgtgctgc tctacgacat 180
gaacggctgt tactcacgcc tcaaggagct ggtgcccacc ctgccccaga accgcaagtg 240
aagcaaggtg gagattttcc agcacgtcat cgactacatc agggacttta atttgnantt 300
naatcggant ccnaatttg 319

<210> 406
<211> 355
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (23)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (27)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (46)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (57)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (86)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (121)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (124)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (145)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (150)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (171)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (216)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (251)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (266)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (283)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (304)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (321)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<400> 406

ggcanaggtn cagctgaccc tgncggncac acagtgccca nagggnaagt ccgtaanatg 60
ccacgtgaaa gcactacacg attccnagcc aggatgtaac tgtgcccctg cccagttccc 120
ncancttccc catgctgcca ncccngattn tggctgaaac gaccggccct ngaggacctg 180
gtcttaggtt cagaagcgaa gcatcacgtg acacantgac cggcctgaga gaatgcctct 240
ggtgaccact ntnacctggg acgccnttaa agtgggaaga gcnctgtttc aaggaccacc 300
tggngcgtga cctgtgtggg nttgntacag gtgttccagt gtgctgactg gttgt 355

<210> 407
<211> 437
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (272)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (370)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (389)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (412)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (430)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<400> 407
ggcanagcac aagcccagca acaccaaggt ggacaagaga gttgagtcca aatatggtcc 60
cccatgccca tcatgcccag cacctgaatt tcctgggggg accatcagtn ttcctgttcc 120
ccccaaaacc caaggacact ctcatgaatc tcccggaccc ctgaaggtca cgtgcgtggt 180
ggtggacgtg aagccaggga agaccccgag gtccagttca actggtacgt ggatggcgtg 240
gaggtgcata atgccaagac aaagccgcgg gnggagcagt tcaacagcac gtaccngtgg 300
ttcagcgtcc ttcaccgtcc tgcaccagga tggcttgaac ggcaagggag ttacaagtgg 360
caaggttttn caacaaaggg cttcccgtnc ttccttgggg aaaacctttt tncaaaggcc 420
aaggggcagn cccgngg 437

<210> 408
<211> 310
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (102)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (137)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (277)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (289)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (294)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (298)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (303)
<223> n equals a,t,g, or c

<400> 408
gggggatatt gtagtggtgg tagctgctct aatttctact tctaccacat ggacgtctgg 60
ggcgaaagga ccacggtcac cgtctcctca gcctccacca anggcccatc ggtcttcccc 120
ctggcgccct gctccangaa cacctccgaa aacacagcgg ccctgggctg cctggtcaag 180
gactacttcc ccgaaaccgg tgacggtgtc ttggaactca gggggctctg accagcgggg 240
tgcacacctt cccagctgtc ctacagtcct caggaancta ctccctcanc accntggnga 300
cgntgcctcc 310

<210> 409
<211> 421
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (52)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (74)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (235)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (246)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (279)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (346)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (417)
<223> n equals a,t,g, or c

<400> 409
gctcagttag gacccatacg gaaccatgga agccccagcg cagcttctct tnctcctgct 60
actctggctc ccanatacca ctggagaaat actgatgacg cagtctccag ccaccctgtc 120
tgtgtctcca ggggaaagag tcaccctctc ctgcagggcc gggcagagtg tttacagcaa 180
cttagcctgg tatcagcaga aacctggcca ggctcccagg ctcctcatgt atggntcatc 240
caccanggcc actgatgtcc cagtcaggtt cagtggcant gggtctggga cagagttcac 300
tctcaccatc agcagcctgc agtctgacga ttctgcagtc tatttntgtc agcagtatat 360
tatgtggcct ggaaccttcg gncnagggac caagggggaa atcanacgaa ctggggntgc 420
a 421

<210> 410
<211> 448
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (342)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (361)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (421)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (443)
<223> n equals a,t,g, or c

<400> 410
gtacggcnng ntnntttcgg gtcgaccgcg ccttccgcgg acgcgtgggt tcggacgcgt 60
gggcggacgc gtggggccga ggctgccaag atgcttggag aagcactgag caagaaccct 120
ggctacatca aacttcgcaa gattcgagca gcccagaata tctccaagac gatcgccaca 180
tcacagaatc gtatctatct cacagctgac aaccttgtgc tgaacctaca ggatgaaagt 240
ttcaccaggg gaagtgacag cctcatcaag ggtaagaaat gagcctagtc accaagaact 300
ccaccccсag aggaagtgga tctgcttctc cagttttgga gnaccaccag gggtccagaa 360
nagccctacc ccgccccatt atcntgcaat ggtccccaca ccgggttccc tgaaccctct 420
nggnttaagg aaaatgaaaa tanccctt 448

<210> 411
<211> 141
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (67)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (95)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (101)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (120)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (138)
<223> n equals a,t,g, or c

<400> 411
gattgatctc atgtgcaaga aaatgaagca cctgtggttc ttcctcctgc tggtggcagt 60
ctcccanatg cgtcctgtcc caggtgcagc tgcangagtc ngggccagga ctggtgaagn 120
cttcggagac cctgtccntc a 141

<210> 412
<211> 473
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (403)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (461)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (471)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (472)
<223> n equals a,t,g, or c

<400> 412
ggaaaggagc cccagccctg agattcccag gtgtttccat tcggtgatca gcactgaaca 60
cagaactcac catggagttt ggactgagct gggttttcct tgttgttatt ttaaaaggtg 120
tccagtgtga agtgcagctg gtggagtctg ggggagccgt agtacagcct gggggtcc c 180
ttagactctc ctgtgaagcc tctggattca cctttgacaa ttatgccatg cactgggtcc 240
gtcaagctcc ggngaagggt ctggagtggg tctgtctcat cagtcgggat ggtcgtaaga 300
catattttgc agactctatg aagggtcggt tcaccatctc cagagacaac agcaaaaact 360
gcctgtatct ccaagtgaac agtctgagag ttgaggacac cgncttgtat tactgtgcaa 420
aagatatccc ggggtcgtcg gtatggacgt ctggggtaaa nggacaccng nna 473

<210> 413
<211> 328
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (183)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (187)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (188)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (228)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (241)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (242)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (288)
<223> n equals a,t,g, or c

<400> 413
ggtcctggac tccaaggcct ttccacttgg tgatcagcac tgagcacaga ggactcacca 60
tggaattggg gctgagctgg gttttccttg ttgctatttt agaaggtgtc cagtgtgagg 120
tgcagctggt ggagtctggg ggaggcttgg tccaagccgg gggggtccct gagactctcc 180
tgngcannct ctggcttccc cctttataac catgggatga cctgggtncg ccaggctcca 240
nngaaggggc tggaatgggt ggccaccata cagtgagatg aaactganaa atactatgtg 300
gactctgtga agggccgatt caccatct 328

<210> 414
<211> 575
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (14)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (361)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (470)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (511)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (527)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (539)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (544)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (573)
<223> n equals a,t,g, or c

<400> 414
ggccgtgaga ttcncaggag tttccacttg gtgatcagca ctgaacacag accaccaacc 60
atggagtttg ggcctagctg ggttttcctt gttgctattt taaaaggtgt ccactgtgag 120
gtgcagctgg tggagtctgg gggaggcttg gtacagccag ggcggtccct gagactctcc 180
tgtacaactt ctggattcac ctttggagat tattctatga gctgggtccg ccaggctcca 240
gggaaggggc tggagtgggt aggtttcatt agaagcaaag cgcatggtgg gacaacagaa 300
tacgccgcgt ctgtgaaaag gcagattcac catctcaaag agatgattcc acaggcatcg 360
nctatctggc aaatgaacag cctgaaaccg aggacacaga cattattact gtctagacat 420
gactacaggc acacccctgg ctactggggg cagggaaccc tggtcaccgn cttctctggc 480
ttccaccaag ggccatcgtc ttccccctgg ngcccttgtt ccaggancac ttccgaaanc 540
cagnggcctg ggcttgctgg gcaagggctc ttncc 575

<210> 415
<211> 438
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (37)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (65)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (139)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (157)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (190)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (201)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (269)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (281)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (301)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (303)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (312)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (323)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (331)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (356)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (371)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (385)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (422)
<223> n equals a,t,g, or c

<400> 415
gtccagtgtg aggtgcagct ggtggagtct gggggangct tggtacagcc tggggggtct 60
ctganactct cctgtgcagc ctctggattc accttcagta gttangacat gcattgggtc 120
cgccaagttg caggaaaang tctggaatgg gtctcangta ttgatcctgc tggtaacaca 180
aactatccan gctccgtgaa nggccgattc atcatctcca gagaaaatga caagagctcc 240
tcgtatcttc aaaatgaatg ggctgacanc cggggaaaac ngtgtgtaat attgtnnaaa 300
nanaaattgc anttcctggt aantgggtan ntncgatctc ttggggccgn nggaanccctt 360
ggttaaatgt nttcctcaag aattnccccga accaagnccc caaaggtttt tcccgcttaa 420
anccttttgaa aaagaaac 438

<210> 416
<211> 502
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (22)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (135)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (145)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (312)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (367)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (428)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (451)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (455)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (474)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (480)
<223> n equals a,t,g, or c

<400> 416
ggcacgagca acgctggcaa tnataacaca aaatattcac agaagttnca ggacagagtc 60
accattacca gggacacatc cacgaacaca gcctacatgg atctnagcag cctgagatct 120
gaagacacgg ctgtntatta ttgtncgagg ggatttttg gggaccgtga ttactactac 180
tactactaca tggacgtctg gggcaaaggg accacggtca ccgtctcctc agcatccccg 240
accagcccca aggtcttccc gctgagcctc tgcagcaccc agccagatgg gaacgtggtc 300
atcgcctgct tngtccaggg cttcttcccc caggagccac ttcagtgtgg acctggagcg 360
aaagggnaca gggcgtgacc gccagaaaat tcccacccag ccaggatgcc tccgggggac 420
ctgtacanca cgagcagcca gctgaccctg ncggncacaa gtgccttagc cggnaagttn 480
cgttgacatt gccacgtgga ag 502

<210> 417
<211> 427
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (230)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (233)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (352)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (363)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (388)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (411)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (427)
<223> n equals a,t,g, or c

<400> 417
gatcatgagt atctatgtga attggtatcg gcagaaagca ggaaaagccc ctgagctcct 60
gatccacggt ggcatccagc ttacaaagtg gagtccccgg aaggttcagt ggcaggggga 120
tctgggacag atttcactct caccattagc agtctgcaac ctgaagattt tggcacttac 180
ttctgtcaac agaattacaa tgtcccgtgg aacgttcggc caggggaacn aangtggaaa 240
atgaaaccga actgtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt 300
gaaatctgga actgcctctg ttgtnttgcc tgctgaataa cttctatccc anaaaaggcc 360
aanttcattg gaaggtggat aacccccncc atcggttact cccggaaaat ntcccaaacc 420
ggacgcn 427

<210> 418
<211> 308
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (126)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (132)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (182)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (254)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (270)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (282)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<400> 418
gctccaactc tggcaacaca gccactttga ccatcagcgg gactcaggct atggatgagg 60
ctgactatta ctgtcaggcg tgggacagta gcgctgtggt cttcggcgga gggaccaggc 120
tgaccntcct angtcagccc aaggctgccc cctcggtcac tctgttcccg ccctcctctg 180
angagcttca agccaacaag gccacactgg tgtgtctcat aaatgacttc tacccgggaa 240
gccgtgacag tggnctggaa angcagatan caaccccgtt cnaggcggaa ttggganaaa 300
caaccaca 308

<210> 419
<211> 482
<212> DNA
<213> Homo sapiens

<220>

<221> misc feature
<222> (370)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (441)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (462)
<223> n equals a,t,g, or c

<400> 419
tcgacccacg cgtccgcagc tgtgggcaca agaggcagca ctcaggacaa tctccagcat 60
ggcctggtct cctctcctcc tcactctcct cgctcactgc acagggtcct gggcccagtc 120
tgtgctgacg cagccgccct cagtgtctgg ggccccaggg cagagggtca ccatctcctg 180
cactgggagc agctccaaca tcggggcagg ttatgatgta cactggtacc agcagcttcc 240
aggaacagcc cccaaagtcc tcatctatgg taacagcaat cggccctcag gggtccctga 300
ccgattctct ggctccaagt ctggcacctc agcctccctg gccatcactg ggctccaggc 360
tgaagatgan gttgattatt actgccagtc ctatgacagc agcctgggtg gttcggtgtt 420
cggcggaagg accaagctga ncgtcctang tcagcccaaa gntgcccccct cggtaactct 480
gt 482

<210> 420
<211> 462
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (85)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (86)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (100)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (438)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (452)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (456)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (459)
<223> n equals a,t,g, or c

<400> 420
gacaggattc aggacaatct ncaccatggc cggcttccct ctcctcctca ccctcctcac 60
tcactgtgca nggtcctggg cccannctgt gctgactcan ccaccctcan cgtctgggac 120
ccccgggcag agggtcacca tctcttgttc tggaagcagc tccaacatcg gaactaatta 180
tgtatactgg taccagcagc tcccaggaac ggcccccgaa gtcctcatct ataagaatga 240
tcagcggccc tcaggggtcc ctgaccgatt ctctggctcc aagtctggca cctcagcctc 300
cctggccatc ggtgggctcc ggtccgagga tgaggctgat tattactgtg catcatggga 360
tgacagcctg agtggtccgg tcttcggcgg agggaccaag ctgaccgtct tgggtcagcc 420
caaggctgcc ccctcggnca ctctgntccc gncctnctnt ga 462

<210> 421
<211> 435

<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (391)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (416)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (423)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (431)
<223> n equals a,t,g, or c

<400> 421
ggaggcagag ctctgggaat ctcaccatgg cctggacccc tctcctgctc cccctcctca 60
ctttctgcac agcggaagag aggccaggcc cctgtggtgg tcatctatga ggacaacaaa 120
cgaccctccg ggatccctga gagattctct ggctccacct cagggacatt ggccaccgtg 180
attatcagtg ggcccaggt ggacgatgat actgacttct actgtcagtc aacacacagt 240
agtaataatg gtaggtccgt atgtcttcgg aactgggacc aaggtcaccg tccttggtca 300
gcccaaggcc aaccccaatg tcantctgtt cccggcctcc tctgaaggag nttcaagcca 360
aacaaaggca cactaagtgt gtctgatcag ngagttttaa ccgggaagtg tgaaantggg 420
ctnggaagca nattg 435

<210> 422
<211> 334
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (11)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (101)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (122)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (135)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (145)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (310)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (323)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (326)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (331)
<223> n equals a,t,g, or c

<400> 422
gcagaactct nggtgtctca ccatggcctg gatccctcta cttctccccc tcctcactct 60
ctgcacagac tctgaggcct cccatgaatt gagacaacca ntttcggtgt cagtgtcccc 120
angacagacg gccangatca cctgntctgg agatgcattg ccagaacaat ctatttttg 180

gtatcaacag aagccaggcc aggcccctgt attggtgatt tataaagtcc atgagaggcc 240
gtcagatgcc ctgaacgatt ctctggctcc aggtcacaga caacagtcac gttgaccatc 300
agtggagccn agggcaaaaa atnngngggg ngtg 334

<210> 423
<211> 597
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (61)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (81)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (115)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (117)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (118)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (132)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (168)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (174)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (176)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (189)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (199)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (201)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (204)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (209)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (217)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (230)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (257)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (259)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (272)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (277)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (296)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (333)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (393)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (412)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (413)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (427)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (457)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (492)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (511)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (513)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (550)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (552)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (580)
<223> n equals a,t,g, or c

<400> 423
nggatttngc caagctctga atcaanctca ctaaagggaa caaaaggtgg agctccaccg 60
nggtggcggc cgctctagaa ntactggatc ccccgggttg cccgggttcg gcganannggg 120
acaatntagg cnatgtaggg tctggtcccc caaatccaga tctgtcgnaa acantnttgg 180
atcaatacnt tgccatggnc ncanaaaanc atgggtncaa catggaacan gctcttggga 240
tgctcttctg gcataancnt aatatccaaa antcatnggc tgatttgccc aacttnaccc 300
ctttcccaga taagtggact gtggaagata aantcttatt tgancaagcc tttacttttc 360
atgggaaaac ttttcataca atccaaccaa tgnttccaca taaatctata gnnngtctgg 420
tgaaatntta ctattcttgg aaaaaagacg aagactnaaa ctattgtgat ggatcgccat 480
gccccggaaa cnaaacggga cgggaagaga ncnacgatga actggaacaa gcaaatggaa 540
caatcccatn gnacttgaag ttggatccaa accaagaaan ccaaagggaa gtcccct 597

<210> 424
<211> 143
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (92)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (96)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (99)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (131)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (138)
<223> n equals a,t,g, or c

<400> 424
gaacacatat aagagcaaaa tctggatcgg caggtgttac anacacaatg tatacgactg 60
gaggcccggt actacagcct cagcctgacg gnacancanc tctcccacat cgtggcggag 120
ttgaggaacc ngaaacanaa aat 143

<210> 425
<211> 323
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (291)
<223> n equals a,t,g, or c

<400> 425
gggcagngga gctctattgc caccatgagt ttctccggca agtaccaact gccagagcca 60
ggaaaacttt gaagccttca tgaaggcaat cggtctgccg gaagagctca tccagaaggg 120
gaaggatatc aaggggtgt cggaaatcgt gcagaatggg aagcacttca agttcaccat 180
caccgctggg tccaaagtga tccaaaacga attcacggtg ggggaggaat gtgagctgga 240
gacaatgaca ggggagaaag tcaagacagt ggttcagttg gaaggtgaca ntaaactggt 300
gacaactttc aaaaacatca agt 323

<210> 426
<211> 683
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (79)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (94)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (112)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (114)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (120)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (124)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (129)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (134)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (136)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (139)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (158)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (163)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (188)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (195)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (206)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (232)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (234)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (241)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (251)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (264)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (275)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (286)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (291)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (301)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (324)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (326)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (338)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (370)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (395)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (399)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (409)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (418)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (487)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (536)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (558)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (578)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (601)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (607)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (633)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (648)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (662)
<223> n equals a,t,g, or c

<400> 426

gaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 60
aaaaaaaaaa aaaaaaaang ggcggccgtt ttanaggatc caagnttacg tncncgtgcn 120
tgcnacgtna tagntnttnt atagggtcac ctaaattnaa ttnactggcc gtcgttttac 180
aacgtcgnga ctggnaaaac cctggngtta cccaacttaa tcgccttgca gnanatcccc 240
ntttcgccag ntggcgtaat ancnaaaagg cccgnaccga tcgccnttcc naacagttgc 300
ncagcctgaa tggcaaatgg gacncncccct gtagcggngc attaagcncg gcgggtgtgg 360
gggttacccn cagcgtgacc gttacanttg ccagngccnt agcgcccgnt cctttcgntt 420
tcttcccttc ctttttcgcc acgttcgccg gttttccccg taaagcttta aatgggggc 480
tcccttnagg gttccgattt agggctttac gggaccttga ccccaaaaaa ctttgnttag 540
ggggatggtt cacgtagngg ggccattgcc cttgatanac gggtttttcg ccctttttgac 600
nttggantcc cacgtttttt aaatagggggg gcnttttttgt tccaaaantg gggaacaaac 660
antttaaccc cttttttttgg ggg 683

<210> 427
<211> 369
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (323)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (337)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<400> 427
tgggcctgag atgcaggtaa aactgctcca gtccctgggc ctgaaatcaa ccctcatcac 60
cgatggctcc actcccatca acctcttcaa cacagccttt gggctgctgg ggatggggcc 120
cgagggtcca gcccctgggc agaaaggttg gcattgggcc cagccctgga agggggatat 180
ccccccagtc ttgctcaagc ccctcaagct cctggaaaac accactttgt gcctgttctg 240
cgcttactcc tgattaatac aatgaatttt cttgggcatt ttacaatttc caacacttta 300
aaaaaaaaaa aaaaaaattc aanggggggg ccggttncca attnccccnn ttttatttct 360
tttaaaatc 369

<210> 428
<211> 299
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (79)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (121)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (295)
<223> n equals a,t,g, or c

<400> 428
ncctaatctc ggaatcctaa gtggtcgcct gaggaccggc cggaattccc gggcacccac 60
gcgtcggcgg tagctgctnt tcctggggcc cgtgggcctc atcatgtacc tcgggggcgt 120
nttcttcatc aaccggcagc gctctagcac tgccatgaca gtgatggccg acctgggcga 180
gcgcatggtc agggagaacc tcaaagtgtg gatctatccc gagggtactc gcaacgacaa 240
tggggacctg ctgcctttta agaagggcgc cttctacctg gcagtccagg cacangtgc 299

<210> 429
<211> 538
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (124)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (133)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (325)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (374)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (432)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (460)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (472)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (473)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (482)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (498)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (499)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (529)
<223> n equals a,t,g, or c

<400> 429
gaagcagaga tctgaagaca gcatgtacac agccattccc cagagtggct ctccattccc 60
aggctcagtg caggatccag gcctgcatgt gtggcgggtg gagaagctga agccggtgcc 120
tgtngcgcaa ganaaccagg gcatcttctt ctcgggggac tcctacctag tgctgcacaa 180
tggcccagaa gaggtttccc atctgcacct caacacactg ctgggagagc ggcctgtgca 240
gcaccgcgag gtaaggggca atgagtctga cctcttcatg agctacttcc cacggggctt 300
caagtaccag gaaggtggtt tggantcagc atttcacaag acttccacag gagccccagt 360
tgccatcaag aaantntacc aggtgaaggg gaanaanaaa tccgtccaac gagngggcat 420
gaattgggaa anttnaaatn ggggttgttt acctggaatn ggcaaaaatt tnnctggttt 480
gngnaatcaa atttgganna aaagggggga ttgcctggat cgggatttnc aaggaagc 538

<210> 430
<211> 552
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (434)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (505)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (508)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (514)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (523)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (535)
<223> n equals a,t,g, or c

<400> 430
gcggacacgg acaggattga cagattgata gctctttctc gattccgtgg gtggtggtgc 60
atggccgttc ttagttggtg gagcgatttg tctggttaat tccgataacg aacgagactc 120
tggcatgcta actagttacg cgaccccga gcggtcggcg tcccccaact tcttagaggg 180
acaagtggcg ttcagccacc cgagattgag caataacagg tctgtgatgc ccttagatgt 240
ccggggctgc acgcgcgcta cactgactgg ctcagcgtgt gcctacccta cgccggcagg 300
cgcgggtaac ccgttgaacc ccattcgtga tggggatcgg ggattgcaat tattccccat 360
gaacgaggaa ttcccagtaa gtgcgggtca taagcttgcg ttgattaagt ccctgcccct 420
tcaacccttc tggnccttcg gaccactgng acttttccat ctttcttaaa cggaggctgg 480
gccttggggg gggggctggc ctggnttntg ttgnccccaa ganggtgctt tcaanggtga 540
ggaacttttt tt 552

<210> 431
<211> 218
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (31)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (36)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (37)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (56)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (60)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (83)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (104)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (107)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (136)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (143)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (168)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (171)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (181)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (196)
<223> n equals a,t,g, or c

<400> 431
cccccggcct gcaggaaatt cgagcagagt ncacanngag ggnaccaccg tcctgntctn 60
ccagttcggg ttgaatgcaa gtnctagccg atttttccta caannantcc agttgattac 120
aattcttcct gtacgncaga ganccctgcc tttaaaagnt gccaacgntt ncctgacgag 180
ncctgcagcc acagtncggc aattcctaca agtgccaa 218

<210> 432
<211> 610
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (401)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (587)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (590)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (592)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (593)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (604)
<223> n equals a,t,g, or c

<400> 432
gcacacccct gggcgtcccc gtcatccagc cgtatcgcct ggactccaag gtcaagcaaa 60
taggaggtgg aattcagagc atcacctaca cccacaacgg agacatcagc cgaaagccca 120
acacacgtaa gcagaagaac ggcttcccgc ccaacttcat ccactcgctg gactcctccc 180
acatgatgct caccgccctg cactgctaca ggaagggcct gaccttcgtc tctgtgcacg 240
actgttactg gactcacgca gctgatgtct ccgtcatgaa ccaggtgtgc cgggagcagt 300
ttgtccgctt gcacagcgag cccatcctgc aggacctgtc cagattcctg gtcaagcggt 360
tctgctctga gccccagaag atcttggagg ccagccagct naaggagaca ctgcaggcgg 420
tgcccaagcc aggggccttc gacctggagc aggtgaagcg ttccacctac ttcttcagct 480
gacaccccgt gagccttgtc agtgtgtaaa taaagctctt ttgccacccc aaaaaaaaaa 540
aaaaaaaact tggggggggg gcccgggacc caattgccct atagggnggn gnnttacaat 600
tcantggccg 610

<210> 433
<211> 328
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (123)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (131)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (132)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (222)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (223)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (225)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (244)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (249)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (266)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (291)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (314)

<223> n equals a,t,g, or c

<400> 433
caaatgtatg gaactaacaa gatggntcca tatcgagatt caaagttaac ccatctgttc 60
aagaactact ttgatgggga aggaaaagtg cggatgatcg tgtatgtgaa ccccaaggct 120
gangattatg nngaaaactt ncaagtcatg agatttgcgg aagtgactca agaagttgaa 180
gtagcaagac ctgtagacaa ggtaatatgt ggtttaacgc cnngnaggag atacagaaac 240
cagnctcgng gtccagttgg aaatgnacca ttgggtactg acgtggtttt ncagagtttt 300
ccacctttgc cgtncatgcg aaattttt 328

<210> 434
<211> 535
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (77)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (274)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (454)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (491)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (504)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (512)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (517)
<223> n equals a,t,g, or c

<400> 434
gggttcgacc cacgcgtccg aggctgaaca ggacagaaag atagaagaag tcagagatgc 60
catggaaaat gaaatnngaa actctctgaa caagaattac aatttcgtcg tctcagtcaa 120
gagcaagttg acaactttac tctggatata aatactgcct atgccagact cagaggaatc 180
gaacaggctg ttcagagcca tgcagttgct gaagaggaag ccagaaaagc ccaccaactc 240
tggctttcag tggaggcatt aaagtacagc atgnaagacc tccatctggc agaaacacct 300
actatcccgc tgggtagtgg cagttgaagc ccatccaaag ccaactgttc nggataatga 360
atttcaccca agctttaacc gcagctattc ccttccagag ttccnggacc cgtggggtgg 420
ttacatggaa gagaaccctt agggcccgtt ttcncatggt ggtttccaaa aattgggccc 480
cgagggtagg nccaatggat tggnttggaa ancccgnaat tagcttgtta cccgt 535

<210> 435
<211> 524
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (138)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (154)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (157)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (238)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (258)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (259)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (269)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (279)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (337)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (338)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (340)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (341)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (342)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (343)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (344)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (345)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (347)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (354)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (375)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (380)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (498)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (500)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (518)
<223> n equals a,t,g, or c

<400> 435
ccctgctcca ccgtccccgt caccacggag gtttcgtacg ccggctgcac caagaccgtc 60
ctcatgaatc attgctccgg gtcctgcggg acatttgtca tgtactcggn ccaagcccag 120
gccctggacc acagcttnct cctgctgcaa aganganaaa accagccagc gtgaggttgg 180
tcctgagctt gccccaatgg cggctcgctt gacacacacc tacacccaca tcgaaganct 240
gccagtgcca agaacacnnt cntgggggnt tccccaacng gaacttcccg ccggggccgg 300
ggggcttncc ccttagcatc tggaacgtag gtttttnnnn nnnnngnnan aaancccccct 360
ttcaattgcc cttcnaaaan ttttacctcc ccccgaacct ctttaaactc cttaaactcg 420
ggttcctctt cttccaaata ttatgttcta attttttttt tcatccctgc tttcccaata 480
taaactcagg gggaaatncn aaaaaaaaaa aaatccangg gggg 524

<210> 436
<211> 384
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (79)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (124)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (177)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (191)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (215)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (320)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (341)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (374)
<223> n equals a,t,g, or c

<400> 436
ggcanaggat caggctggag aagtggatca caccttgttg ggacaatgca caggtggcgg 60
ttacttcatg cagttcagna ccagctcggg gtccgcggaa gaggcagccc tactggagtc 120
tcgnattctt tacccaaaga ggaagcagca gtgcctgcaa tttttctata aaatgancgg 180
ggaagtcctt ncagacagac ttcgttgtct gggtncagga ggggatgaca gcacaggcaa 240
tgttcgcaat tggtgaaggt gcagactttt caaggagatg atgaccacaa tttggaaaat 300
tggcccatgt gggtgcttcn aagaggaaca gaatttcggt naccttttnc caggggcaca 360
aaaggnggac cttnagagct tcaa 384

<210> 437
<211> 390
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (304)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (317)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (372)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (385)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (386)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<400> 437
cttgctcaat gacgccgtca ctgtggtcct gtatcacctc tttgaggagt ttgccaacta 60
cgaacacgtg ggcatcgtgg acatcttcct cggcttcctg agcttcttcg tggtggccct 120
gggcggggtg cttgtgggcg tggtctacgg ggtcatcgca gccttcacct cccgatttac 180
ctcccacatc cgggtcatcg agccgctctt cgtcttcctc tacagctaca tggcctactt 240
gtcagccgag ctcttccacc tgtcaggcat catggcgctc atagcctcag gagtggtgat 300
gcgnccctat gtgggangcc aacacttcca caagttccca caacaacatc aaataatttc 360
ctggaagatg tnggagcagc gtcannaagn 390

<210> 438
<211> 234
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature

<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (82)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (114)
<223> n equals a,t,g, or c

<400> 438
nccccggact tttagtgtaa ngcncctacc ccctgcaggt accggtncgg aattcccggg 60
tttgactcca cgcgttttgc tncattaaca acataaaacc ctcatggaca cganaaaaca 120
ccctcatgtt catacaccta tcccccattc tcctcctatc cctcaacccc gacatcatta 180
ccgggtttc ctcttaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaa 234

<210> 439
<211> 144
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (36)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (114)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (135)
<223> n equals a,t,g, or c

<400> 439
nnctatcgat ggggagcaag agtcttttaa ataagnccat ttnagtccct ggttaacaag 60
ggtttaaagt ggagcgaatg cacatcacag acatgaaatt ggctnacctg cctngcttag 120
aagcccttgg tgttnaggtc aaca 144

<210> 440
<211> 411
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (69)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (86)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (132)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (209)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (230)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (246)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (276)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (340)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (346)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (404)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (410)
<223> n equals a,t,g, or c

<400> 440
gccaaggtcc accccaactc tgtgcacatc tgtgcggtgg ttgtggagta cgagaccaag 60
gctggccgna tcaacaaggg cgtggncacc aactggctgc gggccaagga gcctgccggg 120
gagaacggcg gncgcgcgct ggtgcccatg ttcgtgcgca agtcccagtt ccgcctgccc 180
ttcaaggcca ccacgcctgt catcatggng ggccccggca ccggggtgtn acccttcata 240
ggcttnatcc aggagcgggc ctggctgcga cagcanggca aggaggtggg ggagacgctg 300
ctgaactacg gctgccgccg ctcggatgag gactacctgn accggnagga gctggcgcag 360
ttccacaggg acggtgcgct cacccagctn aacgtggcct tctnccgggn a 411

<210> 441
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (73)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (162)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (232)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (252)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (289)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (360)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (365)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (407)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (472)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (495)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (502)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (504)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (509)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (538)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (560)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (586)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (587)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (619)
<223> n equals a,t,g, or c

<400> 441
gccagcagnc accacagcgc ctgcttcctc ggccctgaaa tcatgcccct aggtctcctg 60
tggctgggcc tanccctgtt gggggctctg catgcccagg cccaggactc cacctcagac 120
ctgatcccag ccccacctct nagcaaggtc cctctgcagc anaacttcca cgacaaccaa 180
ttccacggga agtggtatgt ggtacgcctg gcacggaatg caattctcag anaacacaaa 240
gacccgcaaa anatgtatgc caccatctat gagctgaagg aaacaaganc tacaatgtcc 300
ctccgcctgt ttaagaaaaa aaaatgtgac tacttggatc aggaattttg gtccaaggtn 360
gccanccggc gaattccacc ttggggacct ttaaaattgc cttggantaa ccaatttcct 420
ccttccaatt gttancacca attacaacng ccttcttttg gtttcttcc anaaaatttc 480
tccaaacaag gaatncttcc ananccccnc ttccggaaaa acaaggaatt aattccgnac 540
ttaaaggaaa aattctccgn tctcccattt cttgggcccc ctaaanncaa attcgtcttc 600
ccttttccaa ccaacattnt ttt 623

<210> 442
<211> 211
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (58)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (77)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (93)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (121)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (131)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (178)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (195)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (207)
<223> n equals a,t,g, or c

<400> 442
tgggcagcca cactgcacgc aggctgggcc gactgagggg ctcagangcc aggctctnag 60
gcccacgcag ggcctanggt gggaagatgg cangtggggg cggcgacctg agcaccagga 120
ngctgaatga ntgtatttca ccagtagcaa atgagatgaa ccatcttcct gcacacancc 180
acgatttgca aaggntgttc acggaanacc a 211

<210> 443
<211> 399
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (316)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (347)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (358)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (391)
<223> n equals a,t,g, or c

<400> 443
gtctgagtgg atggacactg cctcttagaa ctagaactta gaactttatc ttgaaaatgt 60
accactgttg cagaagctcc tcacagagta tgtgtcaggc atttttaacc tgctaaaggc 120
aagaagaagt gttcaccaca tagttgcaaa ggtcttcaac ttgccacagc caacagaaaa 180
atcaaaatga ttgaaccctt tgggaatcaa gtatattgtg gccaggccag tgtattctac 240
aaatgctttt gaggaaaatc ataaaaagac aggaagacat cataagacat ttctggatca 300
tctcaaagtg tgttgnaact gttccccaca aaaggcaaga gaattgncct ctctttgntt 360
cccatagcat tttggntgcc agcataccgg nttaaagaa 399

<210> 444
<211> 465
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<400> 444
gcgggactcc aaatgggtcg cagtcgcagc cgctctccac ggagggaacg taggcgttcc 60
cggtccacat cccgggagag agaacgcagg cgccgagaaa ggtccaggtc tcgggagaga 120
gatcggagaa ggagccgctc gcgatccccg caccgaagac gctcccgatc tccaagacga 180
catagatcca catctccttc cccttctcga ctgaaagaaa gaagagatga ggaaaagaaa 240
gaaacaaaag aaacaaagag caaagaacgg cagattactg aggaagactt agagggcaaa 300
acagaggaag aaatagaaat gatgaagtta atgggatttg cctcctttga ctccacaaaa 360
ggtaagaagg tggatngctc tgtaaatgcn tatgccataa atgtctctca gaagaggaag 420
tacaggtatg catagccccc atttttgttt gaactaataa atcag 465

<210> 445
<211> 297
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature

<222> (7)
<223> n equals a,t,g, or c

<400> 445
ggcagtntct ctgccaggct ggggatgatt ccaatagtaa taagaagaat gctgacctcc 60
aagtgctaaa gcccgagccc gagctggttt atgaagacct gaggggctca gtgaccttcc 120
actgtgccct gggccctgag gtggcaaacg tggccaaaat tctgtctggc agagagtggg 180
gaaaagacgc ggtttccagc ttgcagattt gttaagtttc tcaggcagat tttgactttc 240
agcctttcat acttgtttaa gcaactattt gtattaaatg aagtttttg aaaaaca 297

<210> 446
<211> 448
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (22)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (306)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (369)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (448)
<223> n equals a,t,g, or c

<400> 446
tcgacccacg cgtccgccga nnanagtttg gttttgcgga ttgccaccga tgattccaaa 60
gcagtctgtc gcctcagtgt taaattcggg gccacactca aaatcagcag gcttctcttg 120
gaacgggcga gagagctgaa tattgacatc atcggtgtca gcttccacgt gggaagtggc 180
tgcaccgatc ctggagacct tcgtgcaagc catctccgat gcccgctgtg tcttcgacat 240
ggggagctga ggttggtttc aacatgtatc tgcttgatat cggtggtggg ctttcctggg 300
atctgnagga tgtgaaactt aaatttggaa gagatcacca tgttatcaac ccagccctgg 360
gacaantant tcccgggccg aattcgggcg tggacattca tagccgagcc cgggcaggat 420
aattaagttg gcttncagcn ttcaagcn 448

<210> 447
<211> 268
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (10)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (36)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (45)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (60)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (99)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (132)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (135)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (140)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (183)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (192)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (206)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (222)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (243)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (260)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<400> 447
ggcacgaggn agtgtcccag ncgggttcgt gtcgcnatgg ggnanatcga gtgggccatn 60
tgggccaacg agcaggcgct ggcgtccggc ctaatcctna tcaccggggg catcgtggcc 120
acagctgggc gnttnacccn ntggtacttt ggtgcctant ccattgtggc gggcgtgttt 180
gtntgcctgc tngagtaccc ccgggnaaag aggaagaagg gntccaccat ggtgcgatgg 240
ggncagaagt acatgaccgn cntggtga 268

<210> 448
<211> 425
<212> DNA
<213> Homo sapiens

<400> 448
gacaccttca tccgtcacat cgccctgctg ggctttgaga agcgcttcgt acccagccag 60
cactatgtac atgttcctgg tgaaatggca ggacctgtcg gagaaggtgg tctaccggcg 120
cttcaccgag atctacgagt tccatctccc aagtggtttg acgggcagcg ggccgccgag 180
aaccaccagg gcacacttac cgagtactgc ggcacgctca tgagcctgcc caccaagatc 240
tcccgctgtc cccacctcct cgacttcttc aaggtgcgcc ctgatgacct caagctcccc 300
acggacaacc agacaaaaaa gccagagaca tacttgatgc ccaaagatgg caagagtacc 360
gcgacagaca tcaccggccc catcatcctg cagacgtacc gcgccattgc caactacgag 420
aagac 425

<210> 449
<211> 88
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (73)
<223> n equals a,t,g, or c

<400> 449
tcgttgccct gttactgtct gtggnnatgt gcatggtcaa tttcatgatc ttatggaact 60
ctttagaatt ngnggaaaat caccggat 88

<210> 450
<211> 214
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (49)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (53)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (68)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (75)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (89)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (91)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (102)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (108)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (113)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (114)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (141)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (154)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (193)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (204)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (205)
<223> n equals a,t,g, or c

<400> 450
atctccantg gaaccacgtt gtggcngatg ntggggcttt cctgcggtnc aangagccct 60
taccgganta ngtgnggatg gtgactgant nttcaaataa antacganac tgnnccaacc 120
tctctgccac ggacatccaa ntgcttgcac gcanatacca gttggaagca gagtttgttg 180
gggtgtctca acnaaaagtt gagnnaagca acgt 214

<210> 451
<211> 473
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (370)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (444)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<400> 451
gcggacgcgt ggggcaagac ttttgcccgg tacctttcat tccggcgtga caacaatgag 60
ctgttgctct tcatactgaa gcagttagtg gcagagcagg tgacatatca gcgcaaccgc 120
tttggggccc agcaggacac tattgaggtc cctgagaagg acttggtgga taaggctcgt 180
cagatcaaca tccacaacct ctctgcattt tatgacagtg agctcttcag gatgaacaag 240
ttcagccacg acctgaaaag gaaaatgatc ctgcagcagt tctgaggccc tatgccatcc 300
ataaggattc cttgggattc tggtttgggg tggtcagtgc cctctgtgct ttatggacac 360
aaaaccagan cacttgatga actcggggta ctagggtcag ggcttatagc aggatgtctg 420
gctgcacctg gcatgactgt ttgnttctcc aacctgcttt gtgcttctna cct 473

<210> 452
<211> 397
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (225)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (376)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (385)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (389)
<223> n equals a,t,g, or c

<400> 452
gggtcgaccc acgcgtccgc ccacgctcnc gcttgcttgg acatcaggta ccaactgcac 60
tcgttttggc attgcagcta aatatcagtt ggatcccact gcttccattt ctgcaaaagt 120
caacaactct agcttaattg gagtaggcta tactcagact ctgaggcctg gtgtgaagct 180
tacactctct ggctctggta gatgggaaga gcattaaatg ctggnaggcc acaaggttgg 240
ggctcgccct gggagttggg aggcttaatc cagctgaaag aaacctttgg ggaatgggat 300
atccagaaga tttgggcctt aatataattn ccattgtgga ccagcagcag gcttttttc 360
cccccaagaa gattgntcca aaccnangnt gatctcc 397

<210> 453
<211> 463

<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (393)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (404)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (426)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (435)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (453)
<223> n equals a,t,g, or c

<400> 453
ggcaagatgg tgttgcagac ccaggtcttc atttctctgt tgctctggat ctctggtgcc 60
tacggggaca tcgtgatgac ccagtctcca gactccctgg ctgtgtctct gggcgagagg 120
gccaccatca actgcaagtc cagccagagt gttttataca gctccaacaa taagaactac 180
ttaacttggt accagcagaa accaggacag cctcctaagc tgctccttta ctgggcatct 240
acccgggaat ccggggtccc tgaccgattc agtggcagcg ggtctgggac agatttcact 300
ctcaccatca gcagnctgca ggctgaagat gtggcagatt attactgtca gcaatattat 360
actactccct ggacgttcgg ccactggacc aangtggaaa tcanacgaaa ctgtggctgc 420
accatntgcc tcatntttcc gccatctggt gancagttga aat 463

<210> 454
<211> 332
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (95)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (332)
<223> n equals a,t,g, or c

<400> 454
tggctcatct tggctgtgat ttcagtatat gatttagtgg ctgttttgtg tccgaaaggt 60
ccacttcgta tgctggttga aacagctcag gaganaaatg aaacgctttt tccagctctc 120
atttactcct caacaatggt gtggttggtg aatatggcag aaggagaccc ggaagctcaa 180
aggagagtat ccaaaaattc caagtataat gcagaaagca cagaaaggag tcacaagaca 240
ctgttgcaga gaatgatgat ggcgggttca gtgaggaatg ggaagcccag aaggacagtc 300
atctagggcc tcatcgctct acacctgaat cn 332

<210> 455
<211> 429
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (99)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (107)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (109)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (143)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (148)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (158)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (172)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (243)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (271)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (274)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (292)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (314)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (346)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (392)
<223> n equals a,t,g, or c

<400> 455
ggcnagtagt nnggggtccc agggtttgtt tttaaagtag tgacttctac caacatgtcc 60
cgtggttcca gagagcggtt ttgaccgcca cattaccant ttttnancng agggtcggct 120
ctaccaagta ggaatatgct ttnaaggnta ttaaccangg tggacttaca tnagtagctg 180
atcagcggga aagactgtgc agtaattgtc acacagaaga aagtacctga caaattattg 240
gantccagca cagtgactca cttattcaag ntanctggaa acattggttg tntgaagacc 300
ggaatgtcag ctgncagcag atcccaggta cagagggcac gctatnaggc agctaacttg 360
gaatacaagt atggctatga gnttcctgtg gncatgcctg tgtaaaagga tttccggtat 420
ttctcaggt 429

<210> 456
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (38)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (352)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (482)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (516)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (540)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (554)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (570)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (588)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (604)
<223> n equals a,t,g, or c

<400> 456
tggcggcttc cttcacccgc aacccgagag acgacccncc gggcccgccc cgcggaagcc 60
gccggttgcc aggccaagga gtggactagg gtcgccgggg aagcggtttg ggagagccca 120
tggtgactgc gtgagtggag cccagctgtg tggatgcccc agcatggatg actacatggt 180
cctgagaatg attggggagg gctcgttcgg cagagctctt ttggttcaac atgaaagcag 240
taatcaagat gtttgccatg aaagaaataa ggcttccaag tctttctcta atacacagaa 300
ttctaggaag gaggctgttc ttttagccaa aatgaaacac cctaatattg gngccttcaa 360
agaatcattt gaaagctgca ggacacttgt atattgtgat ggaatactgt gatggacggg 420
atctaatgca aaagattaaa cagcagaaaa ggaaaagtta tttcctgaag acatgatact 480
tnaatggttt acccaaatgt gccttggagt aaaatnacat ttaccaagaa acgtgtgctn 540
cccaagagat tttnaaagtc ccaaaaaatn tttttcctta acctcaanaa ttgggaaaaa 600
gttnaaaatt ggggaaaaac ttt 623

<210> 457
<211> 441
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (20)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (185)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (223)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (250)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (391)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (399)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (417)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (432)
<223> n equals a,t,g, or c

<400> 457
atccngaaac tgnaanccgn tgtgtcanct gaaaaaccat tcggtgtgtc tgcacttgga 60
ggctgcactt gcttgcttcc acttatgctt gttctcagaa cacaaacaaa acctgtgaag 120
agtgcctgaa aaacgtctcc tgtctttggt gcaacactaa caagcttgtc ttggactacc 180
agttncaaag tcttgccacc ggcttccctt tgttaattaa ctncttgcac ctngggaatt 240
ttgttgggtn aaacttagaa gcgctgaatc atcacatgtt cggtagtccg gggaaccctc 300
ctcctggggc attggcatct gctgcttgct tgcttgctgc aagaagaaaa aaagaacccg 360
aaacccggac aggaattaaa gaaaaaaggc nttgcgttna accggaaaga aaaagcngaa 420
taccggccgg angaacggaa a 441

<210> 458
<211> 419
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (252)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (278)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (306)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (402)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (404)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (408)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (409)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (410)
<223> n equals a,t,g, or c

<400> 458
ncttcctnta ggagcaggag ggatgagcaa gggtctccca gcgcgacagg acatggagaa 60
agagcgagag actctgcagg cctggaagga gcgcgtgggg caggagctgg accgcgtggt 120
ggctttctgg atggagcact cccacgacca ggagcacggg ggcttcttca cgtgccttgg 180
ccgcgagggg cgggtgtatg atgacctcaa gtatgtgtgg ctgcagggga ggcaggtatg 240
gatgtattgt cngcctgtac cgcactttcg agcgcttncg ccatgctcag cttctggacg 300
cagcanaagc aggtggtgag ttcttgctgc ggtatgcccg ggtggcacct tctggcaaga 360
agtgtgcctt tgtgctgact cggtgacggc cgcccggtca angngcannn aaccatctt 419

<210> 459
<211> 509
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (284)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (331)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (369)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (377)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (393)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (410)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (419)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (472)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (485)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (490)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (493)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (499)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (502)
<223> n equals a,t,g, or c

<400> 459
aattcggcac gagctgaagt nactgatgag tataaaaatn atgtaaaaaa cagatctgtt 60
tatattaaag gcttcccaac tgatgcaact cttgatgaca taaaagaatg gttagaagat 120
aaaggtcaag tactaaatat tcagatgaga agaacattgc ataaagcatt taagggatca 180
atttttgttg tgtttgatag cattgaatct gctaagaaat ttgtagaggc ccctggccag 240
aagtacaaag aaccagacct gctaatactt ttcaaggccg gttnctttgc caaaaaatga 300
ggaagaanca aataagtgga gctaattagg nttacagggc agagcaacca agttgaggag 360
tcctgatgna ctctggngaa gttggtcctt ctnatttcgg ggttngtgcn gccntgggng 420
ttcncacttt tcatcagggn taatgtgctc ccaggccagg gttttttag anccggcttg 480
taccngtcan tgncccctng cnggtcttg 509

<210> 460
<211> 468
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (20)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (445)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (450)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (459)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (465)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (468)
<223> n equals a,t,g, or c

<400> 460
cgccttttgg taccggtccn gaattcccgg ggcttccctc ctcttccttt cttcgccatc 60
gtggtgtgtt cttgactccg ctgctcgcca tgtcttctca caagactttc aggattaagc 120
gattcctggc caagaaacaa aagcaaaatc gtcccattcc ccagtggatt cggatgaaaa 180
ctggaaataa aatcaggtac aactccaaaa ggagacattg gagaagaacc aagctgggtc 240
tataaggaat tgcacatgag atggcacaca tatttatgct gtctgaaggt cacgatcatg 300
ttaccatatc aagctgaaaa tgtcaccact atctggagat ttcgacgtgt tttcctctct 360
gaatctgtta tgaacacgtt ggttggctgg attcagtaat aaatatgtaa ggcctttctt 420
tttaaaaaaa aaaaaaaaaa aaaanaaaan acaaaaaana tcaanaan 468

<210> 461
<211> 580
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (18)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (54)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (249)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (340)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (427)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (433)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (452)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (462)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (466)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (470)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (472)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (478)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (509)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (510)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (556)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (567)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (575)
<223> n equals a,t,g, or c

<400> 461
gggggggggng ggggggtntt aggtttgcct aaaaatattt aggtgacact atanaaggta 60
cgcctgcagg taccggtccg gaattcccgg gtcgacccac gcgtccgtcg acccacgcgt 120
ccgcccacgc gtccgcccac gcgtccgccc acgcgtccgc tgtgtcgtaa aatgggggtc 180
ccttactgca ttatcaaggg aaaggcaaga ctgggacgtc tagtccacag gaagacctgc 240
accactgtng ccttcacaca ggtgaactcg gaaagacaaa ggcgctttgg ctaagctggt 300
ggaagctatc aggaccaatt acaatgacag atacgatgan atccgcccgt ccactggggt 360
tggcaatgtt ccctgggtcc ctaattcttg ttgctccgta tcgcccaact ccgaaaaagg 420
caaaagntta aanaactttg ccacttaaac tngggttaaa tnttcnctgn tnaatttncc 480
ctgttccctt aaaaataatt gaaattatnn aatttccccc tccccaaaaa aaaaaaaaaa 540
ggggggcccc ttaaanattc ccccccnaag gggcnaatta 580

<210> 462
<211> 549
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<400> 462
acngnganac nancctcact aaagggaaca aaagctggag ctccaccgcg gtgcggccgc 60
tctagaacta gtggatcccc cgggctgcag gaattcggca cgaggcgccg ccacaatggt 120
gcgcatgaat gtcctggcag atgctctcaa gagtatcaac aatgccgaaa agagaggcaa 180
acgccaggtg cttattaggc cgtgctccaa agtcatcgtc cggtttctca ctgtgatgat 240
gaagcatggt tacattggcg aatttgaaat cattgatgac cacagagctg ggaaaattgt 300
tgtgaacctc acaggcaggc taaacaagtg tggggtgatc agccccagat ttgacgtgca 360
actcaaagac ctggaaaaat ggcagaataa tctgcttcca tcccgccagt ttggtttcat 420
tgtactgaca acctcagctg gcatcatgga ccatgaagaa gcaagacgaa aacacacagg 480
agggaaaatc ctgggattct tttctaggg atgtaataca tatatttaca aataaaatgc 540
ctcatggac 549

<210> 463
<211> 480
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (7)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (130)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (320)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (410)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (416)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (450)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (455)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (456)
<223> n equals a,t,g, or c

<400> 463
gcctctngcg ggccctgttc aagcggaatc ctgccaaccg gctcggctcc ggccctgatg 60
gggcagagga aatcaagcgg catgtcttct actccaccat tgactggaat aagctatacc 120
gtcgtgagan cacgccaccc ttcaagccag cagtggctca gcctgatgac accttctact 180
ttgacaccga gttcacgtcc cgcacaccca aggattcccc aggcatcccc cccagcgctg 240
gggcccatca gctgttccgg ggcttcagct tcgtggccac cggcctgatg gaagacgacg 300
gcaagcctcg tgccccgcan gcacccctgc actcggtggt acagcaactc catgggaaga 360
acctggtttt tagtgacggc tacgtggtaa aggagacaat tggtgtgggn tcctantctg 420
agtgcaagcg ctgtgtccac aaagggccan aacannaata atgcaatagg ggaggtaaca 480

<210> 464
<211> 220
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (17)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (18)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (30)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (58)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (63)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (67)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (72)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (105)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (129)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (147)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (157)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (170)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (213)
<223> n equals a,t,g, or c

<400> 464
agggacacgt cccatnnngt ggcgggcgcn ctgcggccct tngtgcaggc cacggtgncc 60
gcnaccngaa gncagcctgt tttggaccta aagcggccct tcctnagccg ggagtcgctg 120
agcggccang cctgcgatcg acttgtngtc gactccntgg gtgctcaatn tccctgcttc 180
tttttgttaa ttcccacaca gacatcaagg tgnctgattt 220

<210> 465
<211> 438
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (366)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (383)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (403)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (428)

<223> n equals a,t,g, or c

<400> 465
ataggcatga gccaccacgc caggccggga atgccctatt ctaattcaca taaagactcc 60
atgtgggcta gcaggcatgt gaaatgtctg ccagtgcatc aacagctata taactaagaa 120
gttatctttt tcactgtctt ctggtactct tcatttcact tgggtttttt agcaattcag 180
gaagctggaa tgtttgaatg ggttttagct tgataccttc ttctttttcc catttggcag 240
ataataccac tagtctgacg gataaacacc tggacccaat cagggaaaat ctgggaaagc 300
actgggaaaa actgtgcccg taaactgggn ttcacacagt ctcagattga tgaattgacc 360
atgacnatga gcgagatgga tgnaagaaag gttaccagat gcnccaaaat gggngatgag 420
gaaggctnaa ggggcccg 438

<210> 466
<211> 127
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (53)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (87)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (94)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (118)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (122)
<223> n equals a,t,g, or c

<400> 466
gcacgattca tgcaaaaagg naactaagca ctatgagatg cttgctaatc gancagctgc 60
aaatggtcac tgcattgata tttatgnttg tgcncctgat caaactggac ttttgganct 120
gnagtgt 127

<210> 467
<211> 439
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (194)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (295)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (409)
<223> n equals a,t,g, or c

<400> 467
gctggaatct ttacaggaga accacttcca agaagatgan cagtttctgg gagccgttat 60
gccaaggctt ggcattggaa tggatacttg tgtcattcct ttgaagcacg gtgggctttc 120
cttggttcaa accacagatt acatttaccc gatcgtagac gacccttaca tgatgactcc 180
tgcagttgct gaantcaggc ctgtcccctg cccacacttg gcactgggca taaagcaatt 240
agggaggaag caggaaagcc ctctgctgct gttgcaactg aatacatgct ggcangataa 300
catgtgccaa tgtcctcagt gactctatgc aatgggggtc acggaatgtg acaatatgct 360
gatgctcctt ggaatcataa taaaatgacc gacaggaaaa ggataaatna tcctctgatt 420
atccaaggtt ttaaaacca 439

<210> 468
<211> 484
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (399)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (412)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (415)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (449)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (463)
<223> n equals a,t,g, or c

<400> 468
gagcaggccc gttggaagtg gttgtgacaa ccccagcaat gtggagaagc ctggggcttg 60
cctggctctc tgtctcctcc catcgggagg aacagagagc caggaccaaa gctccttatg 120
taagcaaccc ccagctggac ataagagatc aagatcaatg ctaaactcca atggttcagt 180
gactgtggtt gtcttcttca agccagctga tacctgtcat actgcaggca tctaaattag 240
aaacctgcga gtaaaactga agaaagaagg atattctaat attcttatat tgtgtaatat 300
taaggaatct cttctcgata aaatcacaca tctaagaata aggttaaaan atatttctgt 360
tataccagaa gaaacaacaa tgctgactct ttaatgaana aatactctat antanatggg 420
cgctgaatac tgttgctttc tcacttcang aaaacataat gtntgaaaat ggacgtttca 480
ttaa 484

<210> 469
<211> 489
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (348)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (371)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (417)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (420)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (458)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (468)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (477)
<223> n equals a,t,g, or c

<400> 469
cgcctggcga ttaccggtct caccatggag cggaaagtgc ttgcgctcca ggcccgaaag 60
aaaaggacca aggccaagaa ggacaaagcc caaaggaaat ctgaaactca gcaccgaggc 120
tctgctcccc actctgagag tgatctacca gagcaggaag aggagattct gggatctgat 180
gatgatgagc aagaagatcc taatgattat tgtaaaggag gttatcatct tgtgaaaatt 240
ggagatctat tcaatgggag ataccatgtg atccgaaagt taggctgggg acacttttca 300
acagtatngg ttatcatggg gtattccagt taagttttaa ttggttcntg taaaaagatt 360
agttaganga ngtctaaaag ggtttgnctg agttccatgg tggacccagg ttcaacnacn 420
ctagccggtc cattaccaga atttgttgtt ggcaaagncc cgatcctngg ggaaccnttt 480
ctttcggaa 489

<210> 470
<211> 318
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (32)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (73)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (102)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (103)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (106)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (114)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (151)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (188)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (223)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (258)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (264)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (280)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (281)
<223> n equals a,t,g, or c

<400> 470
cntcactata tntgaggagc nggtacccct gnaggtaccg gtccggaatt cccgggtcga 60
cccacgcgtc cgntatgaca acctgatcac accagccatg annggngccg gctncctgca 120
ggggaacgtc gattcttgcc agggtgacag nggagggcct ctggtcactt cgaagaacaa 180
tatctggngg ctgatagggg atacaagctg gggttctggc tgngccaaag cttacagacc 240
aggagtgtac gggaatgnga tggnattcac ggactggatn natcgacaaa tgagggcaga 300
cggctaatcc acatggct 318

<210> 471
<211> 455
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (306)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (417)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (426)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (431)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (446)
<223> n equals a,t,g, or c

<400> 471
ggagtataca ccatgagcaa agctcaccct cccgagttga aaaaatttat ggacaagaag 60
ttatcattga aattaaatgg tggcagacat gtccaaggaa tattgcgggg atttgatccc 120
tttatgaacc ttgtgataga tgaatgtgtg gagatggcga ctagtggaca acagaacaat 180
attggaatgg tggtaatacg aggaaatagt atcatcatgt tagaagcctt ggaacgagta 240
taaataatgg ctgttcagca agagaaaccc atgtcctctc tccatagggc ctgttttact 300
atgatnttaa aaattaagtc atgtacattt tcatattaaa ctttttgtta aataaacttt 360
tgtaataatc aaaaaaaaaa aaaaaaaaaa aaacccaagg gggggcccgg tccccantcc 420
cccctntttt nattcctttn aaaatnccct ggccc 455

<210> 472
<211> 676
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (605)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (669)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (672)
<223> n equals a,t,g, or c

<400> 472
gctccaggag tgggacggag ggagctggcc gggatgaagt ctgagactat gtcctgagaa 60
gaaagagtgt atcgtattgg ttgaaaagtt ggtggggtcg ggcttaagcg gaggaggggg 120
ctctctggcc cttactcggc agatgggccc ggagagagga cgggaggtgc cgggagaaca 180
tcgagggacc ggtggaggaa gggtagctgg atgagttttg attcatcatg gataatctgt 240
catcagaaga aattcaacag agagctcacc agattactga tgagtctctg gaaagtacga 300
ggagaatcct gggtttagcc attgagtctc aggatgcagg aatcaagacc atcactatgc 360
tggatgaaca aaaggaacaa ctaaaccgca tagaagaagg cttggaccaa ataaataagg 420
acatgagaga gacagagaag actttaacag aactcaacaa atgctgtggc ctttgtgtct 480
gcccatgtaa tagaacaaag aactttgagt ctggcaaggc ttataagaca acatggggag 540
atggtggaga aaactcacct tgcaatgtag tatctaaaca gccaggcccg gtgacaaatg 600
gtcanctttta gcaaccaaca acaggagcag ccagtggtgg atacattaaa cccataacta 660
atgatcccng anaaga 676

<210> 473
<211> 512
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (403)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (457)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (487)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (495)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (500)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (506)
<223> n equals a,t,g, or c

<400> 473
ntcgacagaa gggtacggct gcgagaagac gacagaaggg tacggctgcg agaagacgac 60
agaagggggc agcatggcgt acccggggca tcctggcgcc ggcggcgggt actacccagg 120
cgggtatgga ggggctcccg gagggcctgc gtttcccgga caaactcagg atccgctgta 180
tggttacttt gctgctgtag ctggacagga tgggcagata gatgctgatg aattgcagag 240
atgtctgaca cagtctggca ttgctggagg atacaaacct tttaacctgg agacttgccg 300
gcttatggtt tcaatgctgg atagagatat gtctggcaca atgggtttca atgaatttaa 360
agaactctgg gctgtactga atggctggag acaacacttt atnaattttt gacactgcag 420
gaatggaaca agtagaccca caagaattgg ataaagnccc tgacaacaat gggatttaag 480
gtttgantcc ccaanctggn gaattnaatt gc 512

<210> 474
<211> 272
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (18)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (59)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (69)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (74)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (104)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (122)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (129)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (150)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (185)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (191)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (234)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (249)
<223> n equals a,t,g, or c

<400> 474
ggcacagcgg cgggcccngt cgtccggcgg ttgcggatgt cggctgggc ggacgagcnc 60
ggcgtcgang gccnacgggc gcatctacgt ggggaacttc cgancgacgt gcgcgagaag 120
gnacttggna ggacctgttc tacaagtacn gccgcatccg cgagatcgag ctcaagaacc 180
ggcannccte ntcctgtcgg ccttcgtgcg cttcgaggaa cccccgagat gcanaggatg 240
ctatttatng gaagaaatgg ttatgattat gg 272

<210> 475
<211> 338
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (15)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (36)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (119)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (127)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (170)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (173)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (204)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (250)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (284)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (298)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (308)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (318)
<223> n equals a,t,g, or c

<400> 475
naatctcngt ttggnnggcc cgcccgcagg tccggnccgg aactcccggg tcgacccacg 60
cgtccggcta ccattctgaa acaaatgcaa gtattacatc cagcagccag aatgctggng 120
gagctgncta aggctcaaga tatagaagca ggagatggca ccacatcagn agncatcatt 180
gctggctccc tcttagattc ttgnaccaag cttcttcaga aagggattca tccaaccatc 240
atttctgagn cattccagaa ggccctggaa aagggcattg aaancttgac tgacatgnct 300
cgacctgngg aactgagnga cagagaaact ttggtaaa 338

<210> 476
<211> 424
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (378)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (381)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (388)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<400> 476
ttaagttcat gaattccaga gttttcaaga aaattcaagc tttgaaggct tcaccgtcta 60
agaaacggtg caattcaatc gccgccctaa aggccacttc acaggagatt gtgtcctcaa 120
ttagccagga atggaaggat gagaagcggg atttgctgac tgaaggacaa agttttagca 180
gccttgatga agaagccctg ggatcccgac acaggccaga cctggtccct agcactccat 240
cactgtttga agctgcttcc ttggcaacca caatttcact tcttcctata cgtcaatggg 300
cattatccac aagacaaggc ctacaatttn ttcaaaccag gtaatatttt ggtgcaattc 360
aaattaaccc ttcaaggntt nttaaccnca atcaaccatt agggcctgaa cccgtttttt 420
ttgn 424

<210> 477
<211> 228
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (111)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (153)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (157)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (165)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (207)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (223)
<223> n equals a,t,g, or c

<400> 477
ggcatncatg tcttcagaaa catccataag accaatctct gtgatcttat caccagcctt 60
ttgtgccttt nggttctttt gccaaccaaa gaactcaatg aacacttctn ntccaagctt 120
aaggcaccga ttcctattga acttgttgtt gtngtancag ccacnttaac ctctcatttt 180
ggaaaactac atgaaaatta taattcnagt attgctggac atnttccc 228

<210> 478
<211> 486
<212> DNA
<213> Homo sapiens

<400> 478
aactagtctc gaacggcccc gcggacacgc tggatctgac ctactggatt gacggcaccc 60
ggcatgtggt ctccctggag gacgtcggcc tggctgactc gcagtggaag aacgtcaccg 120
tgcaggtggc tggcgagacc tacagcttgc acgtgggctg cgacctcata gacagcttcg 180
ctctggacga gcccttctac gagcacctgc aggcggaaaa gagccggatg tacgtggcca 240
aaggctctgc cagagagagt cacttcaggg gtttgcttca gaacgtccac ctagtgtttg 300
aaaactctgt ggaagatatt ctaagcaaga agggttgcca gcaaggccag ggaggtaggt 360
gtgttgtgaa aaatgcattt tatatactgg cttggatgga tttctattgt gacatggtgt 420
atgtgtgtgt gtgtatgtgt gtgcattcat gcttgtaaaa atttaagtaa aaatatttgg 480
gtaact 486

<210> 479
<211> 524
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (70)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (369)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (409)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (432)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (471)
<223> n equals a,t,g, or c

<400> 479
ggtgcctgct gcctcaaacc accttgtgta aaatctgcaa tacggcttct tccatgtacc 60
tgtgcctgan ctgtctgcaa taaagaagaa tttgtaaaaa aacggcacct cgctttgctt 120
ttcctccgca accatgtctg acaaacccga tatggctgag atcgagaaat tcgataagtc 180
gaaactgaag aagacagaga cgcaagagaa aaatccactg ccttccaaag aaacgattga 240
acaggagaag caagcaggcg aatcgtaatg aggcgtgcgc cgccaatatg cactgtacat 300
tccacaagca ttgccttctt attttacttc ttttagctgt ttaactttgt aagatgcaaa 360
gaggttggnt caagtttaaa tgactgtgct gccccttca catcaaagna ctactgacaa 420
cgaaggccgc gnctgccttt cccatctgtc tatctatctg gctggcaggg naggaaagaa 480
cttgcatgtt ggtgaaggaa gaagtggggt ggaagaagtg gggt 524

<210> 480
<211> 306
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (15)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (34)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (52)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (64)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (66)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (97)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (129)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (130)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (133)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (134)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (145)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (146)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (161)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (166)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (181)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (186)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (194)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (200)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (233)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (267)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (275)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (304)
<223> n equals a,t,g, or c

<400> 480
ggcagagggc ccgcnagcng ccgccctcct cctnagcctg ctgctgttcg gnttcaccct 60
agtntnaggc acaggngcag agaagactgg cgtgtgnccc gagctccagg ctgcaccagc 120
aactgncann cannagtgcg tcctnnggaa cagcgaaatg ncccgnacaa cctccaagtg 180
nctgcnaggc gggnctgtgn caccttctgc ctctctgccc caatgatgaa ggngggttcc 240
tgcccccagg tgnaacatta aactttnccc aggtngggcc tctgttcggg caccatgcca 300
ggtngt 306

<210> 481
<211> 473
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (411)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (418)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (431)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (445)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (459)
<223> n equals a,t,g, or c

<400> 481
gcctttagct gccatcttgc gtccccgcgt gtgtgcgcct aatctcaggt ggtccacccg 60
agacccccttg agcaccaacc ctagtccccc gcgcggcccc ttattcgctc cgacaagatg 120
aaagaaacaa tcatgaacca ggaaaaactc gccaaactgc aggcacaagt gcgcattggt 180
gggaaaggaa ctgctcgcag aaagaagaag gtggttcata gaacagccac agcagatgac 240
aaaaaacttc agttctcctt aaagaagtta ggggtaaaca atatctctgg tattgaagag 300
gtgaatatgt ttacaaacca aggaacagtg atccacttta acaaccctaa agttcaggca 360
tctntggcag cgaacacttt caccattaca ggccatgctg agacaaagca nctgacanaa 420
atgctaccca ncatcttaaa ccagnttggt gcggatagnc tgactaagtt taa 473

<210> 482
<211> 571
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (4)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (70)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (92)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (307)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (494)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (550)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (565)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (569)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (571)
<223> n equals a,t,g, or c

<400> 482
gannacttct ctngaaacgc ccgtaccggt cttgaattcc cggctcgacc cacgcgtccg 60
gatgacggtn ccgggcgcct ctcccgagga cncttgggtc aaggtggagt atgcctacag 120
cgacaacagc ctggaccccg ggctttttgt agaaagcacc cgcaagggga gtgtagtgtc 180
cagagctaat agcatcggtt ccaccagtgc ctcttctgtc cccaacacag atgatgagga 240
cagtgattac caccaggagg cctacaagga gtcctacaaa gaccggcggc ggcgcgnaac 300
acacttnagg cttgagcaga agaggaggga cgccatcaag agaggctatg atgaccttca 360
gaccatcgtc cccacttgcc agcagcagga cttctccatt ggctcccaaa agctcagcaa 420
agccatcgtc tacaaaagac cattgactac attcagtttt tgcacaagga gaagaaaaag 480
caggaggagg aggngtcacg ttacgcaagg atgtaccggc ctaaagatca tgaaagtgaa 540
ctatgagcan attgtgaagg cacantagna n 571

<210> 483
<211> 220
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (16)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (69)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (99)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (136)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (179)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (183)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (185)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (215)
<223> n equals a,t,g, or c

<400> 483
aatacaacgg gaatcnctaa ctgccttgcg tgaaggtccc ggtccggaat tcccgggtcg 60
acccacgcnt ncgggccagg atgctgaatc tgctgctgnt ggcgctggcc gtcctggcga 120
gccgcgccta cgcggncccct gccccaggcc aggccctgca gcgagtgggc atcgtcggng 180
gtnangaggc ccccaggagc aagtggccct ggcangtgag 220

<210> 484
<211> 439
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (18)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (35)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (36)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (394)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (406)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (414)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (434)
<223> n equals a,t,g, or c

<400> 484
gggangggag gggaaatnct tctcggtatc nggtnnctgg agctccaccg cggtggcggc 60
cgctctagaa ctagtggatc ccccgggctg caggaattcg gcacgagcag cccagcagcg 120
gctgaccctc tgcctgcggg gaagggagtc gccaggcggc cgtcatggcg gtgtcggaga 180
gccagctcaa gaaaatggtg tccaagtttt taacgatggc agttccaggg aactaatgaa 240
cctcactgga acaatccctg tgccttatag aggtaataca tacaatattc caatatgcct 300
atggctactg gacacatacc catataatcc ccctatctgt tttgttaagc ctactagttc 360
aatgactatt aaaacaggaa agcatgttga ttgnccaaaa aaattngggg gggnaaaaaa 420
ggggaaaatt ttantttt 439

<210> 485

<211> 115
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (11)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (69)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (71)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (87)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (89)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (104)
<223> n equals a,t,g, or c

<400> 485
gacaaagtaa ngcatccctc ctgaccatca gacgttgatc tttgctggga aacatctgga 60
aaatggacnc nccctgtctg actacancnt ccacaaagaa tccnccctgc acctg 115

<210> 486
<211> 558
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (12)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (151)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (159)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (255)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (270)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (353)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (402)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (404)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (410)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (416)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (488)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (495)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (517)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (539)
<223> n equals a,t,g, or c

<400> 486
ntctctgngg tntagctgaa cgccgaggac cggccgaatt cccggtcgac cccgcgttcg 60
ttcttttagc atcaaggaat ctgatgagaa agcaggaaag atcttttcac agatgaacaa 120
tattatgagt aaaagtttgc atgatgatgg ntttactgnt ccacagatta ttgaaatgga 180
gctggatagt caggagcaag ttgttgttgc aggatcctcc tgtgacttac attcagcaat 240
ttgcagatgc agcanccaac cttacctctn cggattctga gaagtggaac tctgtgtttc 300
ccaagcctgg gactttggtt caagtgcttg aggctgcaaa gtttgcatag gangagaatc 360
tttgtataac tcaataactc cttgtgctga cggaattcat tngntggtan gactgnggac 420
atgccctgtt gaatccttga gtgcaataaa tcaaagtaga aggccttgna taatttaaat 480
taaattanac tctgnactat gtaataaccg gaaaggnaac tgcaatcaaa tttgcttgna 540
tggaatgggg caaaatta 558

<210> 487
<211> 354
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (13)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (15)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (18)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (79)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (114)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (115)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (120)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (127)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (155)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (195)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (203)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (229)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (239)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (307)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (315)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (343)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (346)
<223> n equals a,t,g, or c

<400> 487
gctctgctca acngngangg ntcggcacaa cattcagaag gaattatgtc ttcatgctgc 60
tcaaggtctc gctcagctna aggcatgtac ctacaaaggt cacaagacag gtgnnactgn 120
agagcanata tgggagatcc agaaggatca acttntatac tatccattct taaaaatgtg 180
cctttcagca aatgntgagc atncaagctt agtggatgca acccatcana accactccna 240
aaatggatac ttagccaaaa tgattaagcg ttccttaaaa ttaacttgac caaggaaata 300
tcctttntca taaanctgtg actaggcata cactgtagnt gtnganaatt atgc 354

<210> 488
<211> 508
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature

<222> (134)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (236)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (242)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (258)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (275)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (288)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (298)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (300)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (314)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (349)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (375)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (387)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (400)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (407)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (412)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (413)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (424)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (429)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (434)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (440)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (441)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (450)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (456)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (458)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (462)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (469)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (475)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (478)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (485)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (493)
<223> n equals a,t,g, or c

<400> 488
aattcggcac gagaaagcgc atggagacta agggagctgg agtgaccctg aatgttctgg 60
aaatgacttc tgaagattta gaaaatgctc taaaagcagt catcaatgac aaaagttaca 120
aggagaacat catncgcctc tccagccttc acaaggaccg cccggtggag ccgctggacc 180
tggccgtgtt ctgggtggag tttgtgatga ggcacaaggg cgcgccacac ctgcgncccg 240
cnccccacgg acctcacntg gtaccagtac cattnccttg gccgtgantt ggtttccntn 300
ttggcccttg gtcntgaaat tggccttaat aacctttaaa attttgctnt natggttacc 360
cgaaaatttt ggggnaaaaa agggccnttt aagaaagccn caaaatnaga cnnccttttg 420
aaangggtng gganaaaggn naaaattttn accttncncg gnatttccna atttnaanag 480
atagngttta aanattttt tttttagg 508

<210> 489
<211> 425
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (3)
<223> n equals a,t,g, or c

<400> 489
ccncggtggg atgttgagct gaggccggag gagaagtagc agtcgctggc agagcacaca 60
ggctgctctg ggggatgagc tggtgcgttt aaggaacagg ccagcactgg cattcgcaag 120
cagtggggaa ggggagagat gccgaggtgg tcagtatcct gactttcaga ggcctttttt 180
tgtttgtttt aatttttgct agattgatat taaaaactca tgtggaggaa ctcaaggaat 240
gtttagaaga ccaaaagtcc ccaatgacag gaacaaaagc aaccaatttt taactttctc 300
ttctcattcc tgttttcatt gatttcccac atgtagtcct tttgctcagg aagtctttgg 360
ggaaattaag gatctttgaa gctctgaaat aggtgatcag gttagtggtg tctgtcagct 420
gtctg 425

<210> 490
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (2)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (5)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (6)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (9)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (58)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (443)
<223> n equals a,t,g, or c

<400> 490
ancanncnna caccacctca ctaaagggaa caaaagctgg agctccaccg cggtgcgncc 60
gctctagaac tagtggatcc cccgggctgc aggaattcgg cacgagaagc cgtcaaggag 120
tagaaattgg tatgcttaga agcagattct aaaagcagtt tctcttcaga acatcttttt 180
tcataccact tgataagcat cttgaaacac catggctgta gctgcagtaa aatgggtgat 240
gtcaaagaga actatcttga aacatttatt tccagtccaa aatggagctt tatattgtgt 300
ttgtcataaa tctacgtatt ctcctctacc agatgactat aattgcaacg tagagcttgc 360
tctgacttct gatggcagga caatagtatg ctaccaccct tctgtggaca ttccatatga 420
acacacaaaa cctatccctc ggncagatcc tgtgcataat aatgaagaaa cacatgatca 480
agtgctgaaa accagattgg aagaaaaagt tgaacacctt gaggaaggac ctatgataga 540
acaacttagc aaaatgtttc tttactacta agcaccgttg gtatcctcat ggacggtatc 600
acagatg 607

<210> 491
<211> 371
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (81)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (265)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (336)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (339)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (353)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (368)
<223> n equals a,t,g, or c

<400> 491
aaactgtaat tgcaatgttg aggggtgact tgctaaccag tcagttgaat tccaggcaca 60
gattgagttg cttctggagt nggcagggtc actgtgaacg cctacgtgag cctcttctac 120
accataaagc gggcacaagt ggtcagtcct gaaagagtcg gaagctggca tatcggccgc 180
ccaagtgacc ctgtccagtg tctgcttgcc atcctgccag aacaggccct caagcccaag 240
agccatccca ggcctgtttc agctncagct aaagcctctc tttcatctgg aagaagaggc 300
aagggggcag gagaccaggc tctagctctg gggccntcnt tcagccccca tcnggggaat 360
aaanttantt t 371

<210> 492
<211> 440
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (347)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (353)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (397)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (402)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (434)
<223> n equals a,t,g, or c

<400> 492
ttgagtcgtg ttaatgtaag aatgactcct atcattagga gtgctgctcg gaggttactc 60
acctttggga gtaatactga agagaggggt ctgcagaaag gatgtgtatg aagcttagat 120
aataatggct gtttcgtaaa ctgtttgaga cctattaatg aaaatgacta tttcttgctg 180
tttttatcca acgtctgcat tttccccctt taaagctgcg gtctcctgtt tgataaaaga 240
atattggcca gtattgcaga ttttaactgg atttggctga tcctccaggg gaccagtttc 300
tgtgggcgtg tattggagca ggtttgtctt taactcttaa atggttnggt ccnaattttt 360
aaaaaggaag ggccccaagt agcccagatt taaaggngta tncccattcc caaagttcct 420
tggaacaatt accnaaagga 440

<210> 493
<211> 90
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (1)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (20)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (27)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (49)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (56)
<223> n equals a,t,g, or c

<400> 493

ngggagctgg cctggagcgn atgggcnccg tgatggatcg catggccanc ggctgncagc 60
gcatgggccc atcaatctgg agcggatcgg 90

<210> 494
<211> 218
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (30)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (46)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (53)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (78)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (87)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (95)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (135)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (163)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (167)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (192)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (216)
<223> n equals a,t,g, or c

<400> 494
gggtcgaccc acgcggtccg tttttttntn ttttttttagn tcccannttt tantcaagaa 60
ctcatacaaa attttccnga taaatgnaat ttaancctcg tcttcctcct cttcttcgtc 120
ctggttaatc tgggnagtaa cgtaattcgt aactctcttt ggntgtnagc aactgacgcg 180
caaccagttc angtagatta ttcttcttca aatatngt 218

<210> 495
<211> 148
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (83)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (96)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (111)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (116)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (122)
<223> n equals a,t,g, or c

<400> 495
gtttttaaaa aaaacatgtc atgtangttg tctaaaaata aaatgcattt aaactcaaaa 60
aaaaaaaaaa aaaaaaaaaa aanaggggg gggcgnggga aaaaaaaaaa ngaggntgag 120
gntttgaaga agggaagggg ggcccccc 148

<210> 496
<211> 536
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (355)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (382)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (412)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (444)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (460)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (484)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (534)
<223> n equals a,t,g, or c

<400> 496
atgacccaca ctgccagaag agaattcagt attttttact tttcacactg tcttcccgat 60
gagggaagga gcccagccag aaagcactac aatcatggtc aagttcccaa ctgagtcatc 120
ttgtgagtgg ataatcagga aaaatgagga atccaaaaga caaaaatcaa agaacagatg 180
gggtctgtga ctggatcttc tatcattcca attctaaatc cgacttgaat attcctggac 240
ttacaaaatg ccaagggggt gactggaagt tgtgggatat cagggtataa attatatccg 300
tgagttgggg gagggaagac cagaattccc ttggaattgt gtattgatgc cattntaagc 360
ctaaaagatc accttgtatt cnctttacct tctaaaagcc attatttatg gngttagaag 420
aagaggaaga aattcaggta ccgnaaaaca cttttgttcn gggggggccc cgtacccaat 480
tcgncccata gtgagtcgta ttacaatcac gggccgtcgt ttacacggcg gacngg 536

<210> 497
<211> 93
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (84)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (85)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (88)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (89)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (91)
<223> n equals a,t,g, or c

<400> 497
gtgaaacatc aataaagacc acttaatgca cgctttcaaa aaaaaaaaaa aaaaaaaaaa 60
aaaaaaaaaa aaaaaaaaaa aaannaanna nat 93

<210> 498
<211> 392
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (8)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (50)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (104)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (106)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (113)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (160)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (180)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (181)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (245)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (248)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (334)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (363)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (377)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<400> 498
cgggaccnaa ggaggagctg cgtggcggcg gtggcgacat ggcggacctn ccgaggcggg 60
tgacgcgccc cctgatgatg ggcctccagg ggagctcggg cctnanggcc tgnacggtcc 120
agaggaaaag ggccgggatc gtgaccggga gcgacggcgn acaccggagc gagcgcgagn 180
ncgccgggac cgggatcgtg accgtgaccg tgaccgcgag cacaaacggg gggagcgggg 240
cattnaancg gggcagggat gaagcccgaa gttgggggcg gtggccagga caacgggttg 300
gaaggtttgg gcaacgacag ccgagaattt tacntgaatt ttaaggcggc nacgttactt 360
gtnccggaaa ttggttnttt attgaagttn cc 392

<210> 499
<211> 262
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (23)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (60)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (76)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (78)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (104)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (114)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (160)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (209)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (212)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (218)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (219)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (226)
<223> n equals a,t,g, or c

<400> 499
ggtaagagca acgtgctttg ggngcagaga agagggagan agcagcatct tgcctggatn 60
agccagggga cacagnanag aagcccacct ggacacaaca ccanaaaggc ttcntattcg 120
ggtgtggagt cttttcagca acccggtcca gtactgggcn gatacagcca tccaccttac 180
agatgtgtct acgtgacgct ctgccattnc anctcggnna ctatangtaa ttctcaagaa 240
agccctcatt tttataacct gg 262

<210> 500
<211> 437
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (309)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (317)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (384)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (398)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (405)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (406)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (418)
<223> n equals a,t,g, or c

<400> 500
accacaaagc ccccctggag catcttcccg gctggcagga ccatgccatc tctgtggaga 60
aggtgctggg gagggaagtc cttccagtgc cacatggagt gaggccctgc ccatgctggg 120
gactttgggg aggaatttgg tattctggtg gccttgctca gctctcattg agatcttttc 180
ctatcagaat gttagtgaat atacttcgca gctctttgtt cagcaataag gaatattctt 240
tcaattcctg ctcttcaagc caatttacta cacccatttg tctttccaaa attcatccca 300
acggtatant tggtttnggt cctccttgga ttcaatctgt ttcctggtaa aattgaacct 360
gtccattgtg aatcctctta attncctcct cccaaaanaa ccagnncttg taaatttntg 420
gccaactcca ggggcca 437

<210> 501
<211> 180
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (162)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (165)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (166)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (174)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (177)
<223> n equals a,t,g, or c

<400> 501
gagaactagt ctcgagtttt tttttttttt tttttttgtt ttttggctct ttcaaaggta 60
atggcccatc gatgagcatt tttaacatac tccatagtct tttcctgtgg tgttaggtct 120
ttatttttat ttttttcctg ggggctgggt gggtttgggg gncanngggg gaantgncct 180

<210> 502
<211> 436
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (101)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (174)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (197)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (199)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (222)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (225)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (229)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (262)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (266)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (276)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (287)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (290)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (297)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (327)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (328)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (330)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (336)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (343)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (364)
<223> n equals a,t,g, or c

<220>

<221> misc feature
<222> (385)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (390)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (436)
<223> n equals a,t,g, or c

<400> 502
tacaaactgt cctttattca gagtgagact gcggaacatt aataatttat cacgcgggga 60
gtccccagaa gccctgtgcc cacgaacccc tgtgggcgga nggagagaag cggggactcc 120
gggagcttcc tgagagggcc gtgtcttggg agcaaggtga catatccagt ccangcacgc 180
ggaacatgac tcagaantng ggaaacaaaa aaccatcccc cnccngaang gggggggcca 240
ggcccctaaa aagcacaatg gnggcnggtg gaattngggt taaaatntcn gggttcnaaa 300
aagaccatat tttttttcc cagttcnntn gccccncctt ttnttgttaa ggggggggt 360
taanattccc ccctccccgg gaaanaaaan tacctttctt aggaagaagg gccccccccc 420
ccttcccgcc tttttn 436

<210> 503
<211> 418
<212> DNA
<213> Homo sapiens

<220>
<221> misc feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (50)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (55)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (56)
<223> n equals a,t,g, or c

<220>
<221> misc feature

<222> (57)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (61)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (62)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (72)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (94)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (97)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (106)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (109)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (110)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (111)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (112)

<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (116)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (125)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (126)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (127)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (130)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (179)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (210)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (212)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (221)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (226)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (237)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (239)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (245)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (253)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (256)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (257)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (289)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (337)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (350)
<223> n equals a,t,g, or c

<220>
<221> misc feature
<222> (351)
<223> n equals a,t,g, or c